VOL. XXVI. No. 8.

AUGUST 1941

MECCANO MAGAZINE

THE COXSWAIN

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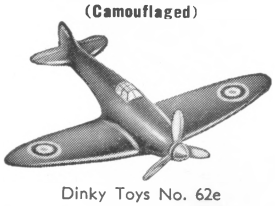

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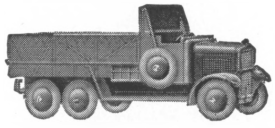

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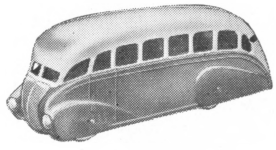

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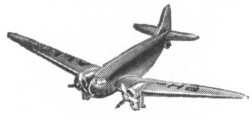

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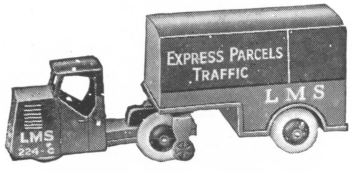

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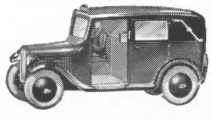

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SPECIAL NOTICE

Will readers of the *"Meccano Magazine"* please note that, due to pressure of other work, we have been compelled temporarily to discontinue our Repairs Department, and no further work of this kind can be accepted.

When we are able to resume work in our Repairs Department we will at once make an announcement in the "M.M." and to our dealers.

MECCANO LIMITED

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 8
August 1941

e Editor

River Crossing—Modern Sty

There are many ways of crossing a river or waterway, from jumping across it, if it is young and narrow enough, to passing over it on a giant bridge or under it through an immense tunnel. Neither tunnels nor bridges are rare, and many different ways of constructing them have been tried, but there are few places that can boast such unusual means of negotiating a waterway as a tunnel that was built on dry land and then sunk comfortably into its bed; or a bridge, nearly 1¼ miles in length, that is afloat for practically its whole length. Both these novel structures, which will be described and illustrated in the September issue, are fine examples of American engineering. The floating bridge is no obstacle to navigation, for it has an ingenious arrangement whereby one of its floating sections can be pulled back into a well left in the middle of the next, thus giving clear passage for comparatively large vessels.

Leaders in the War

XXI.—Sir Philip B. Joubert

Sir Philip Bennet Joubert de la Ferte was born in Calcutta, India, in 1887, educated at Elstree, Harrow, and Woolwich, and entered the Royal Field Artillery in 1907. While serving as a gunnery officer he became interested in flying, and qualified as a pilot in September 1912. In the following year he was seconded to the Royal Flying Corps.

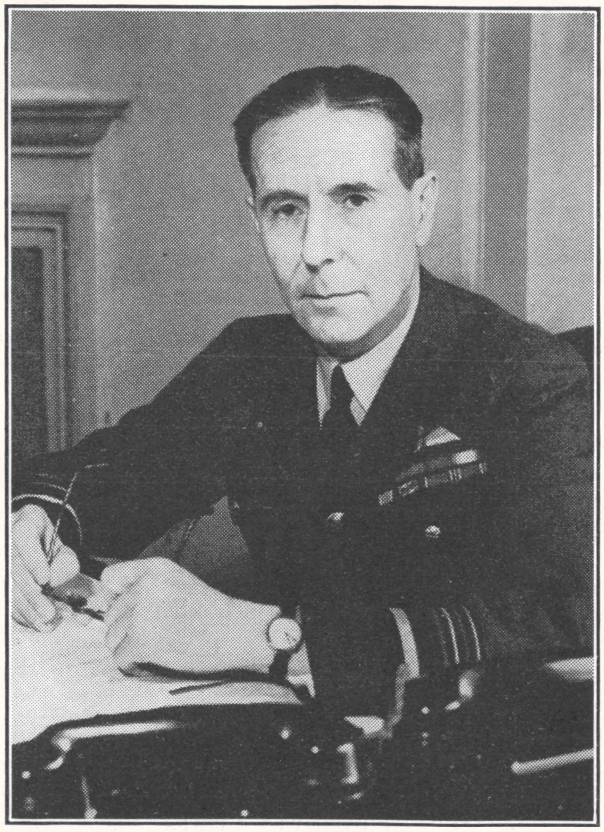
In the war of 1914-18 he made aviation history on 19th August 1914 by carrying out the first air reconnaissance over the enemy, a flight to the vicinity of Nivelles, in Belgium, to discover the whereabouts of the German Army. In 1916 he was transferred to Egypt, and subsequently was sent to Italy, where in recognition of his services he was awarded an Italian Order. His war services earned him also mention six times in dispatches, and the D.S.O.

Since 1929 he has held a succession of Commands that have given him fine opportunities to exercise his flair for air organisation. They have included four years as Commandant of the Royal Air Force College. For three successive years he was Air Officer Commanding the splendid R.A.F. displays at the annual Hendon Air Pageants.

From 1934 to 1936 Sir Philip was Air Officer Commanding, Fighting Area, and he did good work in building up the newly-formed Coastal Command during his brief command of it in 1936-7. He left this post to take command of the R.A.F. in India, and flew out there in one of two aircraft bought by the Government for the use of the Viceroy. In 1939 he was back again in England, and for some time he was in charge of the air defences of London. When the first of the big air manœuvres in this country were held he again showed his initiative by staging a breakdown of the defence system so that valuable lessons might be learned from it.

Last year he made a great reputation for himself as a first-class broadcaster by his striking surveys of the war situation.

In June last Sir Philip was re-appointed Air Officer Commanding-in-Chief, Coastal Command. In this capacity his exceptionally varied experience will be of great value, and in a Command that has to carry out aggressive fighting duties of many kinds his initiative and keen intelligence will have full play.



Air Marshal Sir Philip Bennet Joubert de la Ferte, K.C.B., C.B., C.M.G., D.S.O., Air Officer Commanding-in-Chief, Coastal Command, Royal Air Force.

* * * *

In addition to the articles referred to in my first paragraph, next month's issue will include a splendid article by Captain Bernard Acworth, D.S.O., R.N., dealing with the guns of the Navy. The cover picture will show a striking close-up view of the guns of a battleship. There will be also the second instalment of "Railway Engineer's" description of railway working in Australia.

Building a Modern United States Airport

La Guardia Field, New York

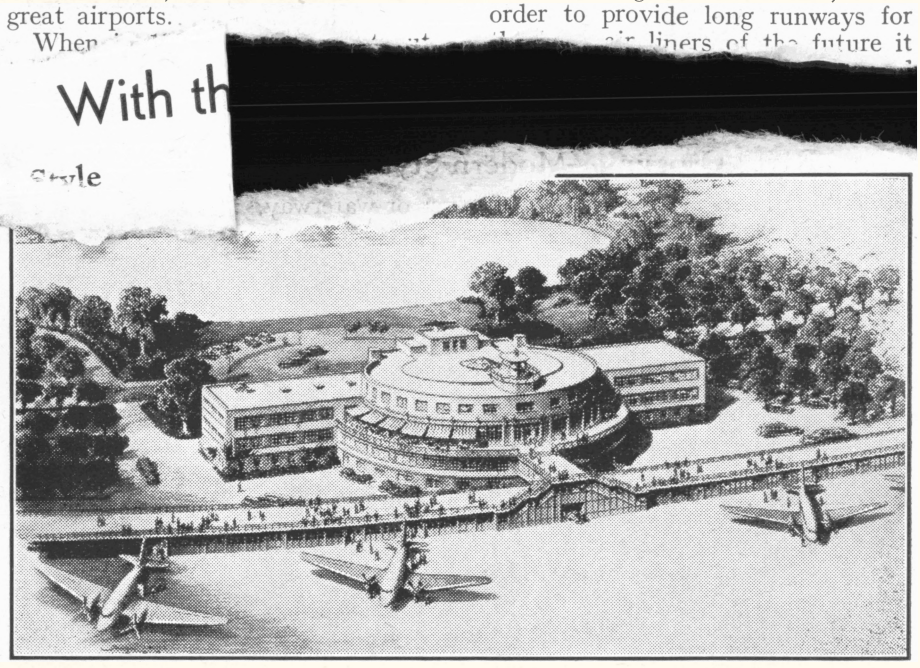
By Edward T. Myers

AIRPORTS in the United States have largely developed from the old "landing fields" of early aviation days. Usually these "fields" large tracts [illegible] equip them as municipal airports. Each city endeavoured to have an airport as good as or better than those of its neighbours, in the hope of becoming a permanent calling point on an air mail line.

Air lines arose and multiplied rapidly in the twenties of the present century, but actually commercial aviation had only begun then. Few people flew, and those few were either adventurous or on missions of life and death. Geographical conditions in the United States did not warrant the early development of services similar to those between London and Paris.

In recent years, as aviation became an established means of transport, and thousands of people and tons of mail and express freight were being flown daily, the imperfections of the old airports became apparent. They were usually too far from the business sections of the cities, and they could not be used by trans-oceanic aircraft, for which separate flying boat bases had to be established. Efforts were then made to correct these and other shortcomings. For instance San Francisco planned its Exposition Island as a future airport, Chicago considered enlarging its World Fair Island for a similar use, and New York planned and constructed La Guardia Field, now one of the world's great airports.

When [illegible] for extending the shore line, as in order to provide long runways for [illegible] liners of the future it



The administration building at the landplane base, La Guardia Field, New York, as visualised by the architect. The illustrations to this article are by courtesy of New York City Works Progress Administration, U.S.A.

at first known as the North Beach Airport. This was a city-owned undeveloped flying field on a peninsula of Long Island, a 20-min. journey from the heart of the city. The peninsula jutted into the so-called East River—which actually is not a river, but a narrow passage between Long Island and New York itself. The field was only 105 acres in extent. It had three small hangars on the north shore, half hidden from the road by a hill.

The first task in developing this flying field was to level the hill. The material removed was used as "fill" the river and partly by utilising vast piles of "fill" material heaped on an island not far offshore. Great mounds of cinders and ashes had been accumulating on this island for over 50 years, and some of the smouldering hills were over 100 ft. high and had become an East River landmark.

This material was transferred to the western side of the peninsula, where an embankment, rip-rapped by large uneven rocks dumped along the new boundary, protected the filled area. It was carried in trucks over a temporary trestle erected across the East River. This trestle was 2,280 ft. long and 24 ft. wide, and owing to commercial shipping regularly using the river, it included a steel, floating swing-span bridge 240 ft. long and weighing 300 tons. The trestle was built of steel and supported on "H" piles, and had a wooden deck that provided two traffic lanes.

These facilities for transporting the 'fill' enabled the work to be carried on on a big scale. The force engaged was increased to 5,000 men, floodlights were installed throughout the field and island, and operations

The imposing front of the landplane administration building, showing the motor traffic circle and ramp that provide for discharging and loading passengers at two levels of the terminal.

continued by day and night, 20 steam shovels and 400 trucks being used in levelling the island and transporting 17,300,000 cu. yd. of 'fill' to the airport. When the erection of the hangars began the number of workmen employed rose to 11,000, and by early in 1939 had increased to 20,000 men.

Planning the runways required considerable skill, more than might at first be apparent. Wind direction had to be considered above all, so first a "wind-rose" or diagram was made from meteorological records showing the prevailing winds at the site. A runway 6,000 ft. long was constructed in the direction of the most frequent winds, the north-west, and a second a mile long in the direction of the second most frequent winds, north-east. Both are 200 ft. wide, and two shorter runways, each 150 ft. wide, were laid east to west and north to south respectively.

La Guardia Field airport was officially declared open for service just after midnight on 1st December 1939. It has both landplane and flying boat bases, so that passengers can transfer easily and quickly from trans-continental air liner to ocean-going flying boat, or vice versa. Each base has its own administration building, hangars, and maintenance shop.

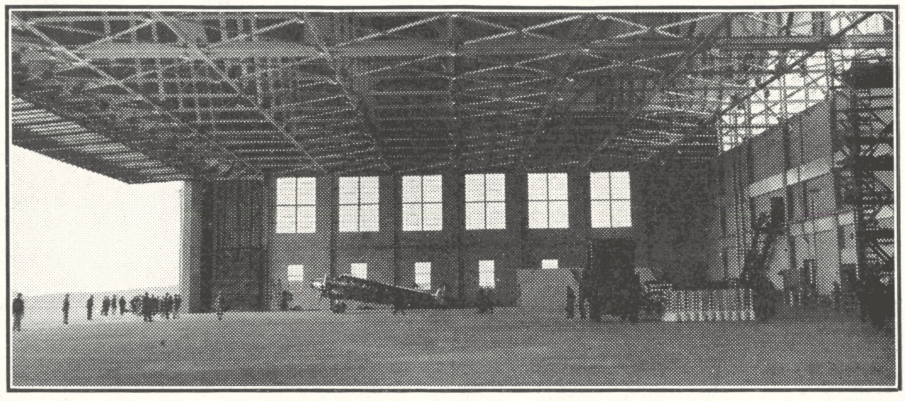
The architect's drawing reproduced on the opposite page gives a good idea of the layout and traffic facilities at the landplane base. The main building, or passenger terminal, is 300 ft. long and on the flying field side of it is a huge central rotunda 170 ft. in diameter. In the basement of the building are the air mail, express, and baggage facilities, a passage for trucks, and a post office; and on the first floor are the main concourse with ticket windows, the operations offices, and the pilots' quarters.

The main concourse in the landplane administration building.

The second floor contains the restaurant, cafeteria, kitchen, and lounge, and encircling the lounge is an observation platform that overlooks the flying field. The circular portion of the building has a third floor on which are the traffic control and communications offices and the weather bureau, and on the roof is a control tower, the floor of which is 56 ft. above ground level.

Facing the flying field is a loading platform 1,500 ft. long and 20 ft. wide. It is connected directly to the first floor of the rotunda, and by an open promenade on its roof to the second-floor observation platform. This long roof promenade is a favourite vantage point for visitors. The lower illustration on the opposite page shows the Grand Central Parkway side of the landplane administration building, and the traffic circle, with ramp, that provides for discharging and loading motor car passengers at two levels of the terminal.

This imposing building is flanked on each side by three fine hangars, and the whole group of seven buildings is laid out in the form of an arc. Each hangar is 350 ft. wide, 165 ft. deep, and 42 ft. in height from ground to roof trusses, and its entire interior forms a vast unobstructed space. The steel doors along the whole front are raised electrically when required to give access to a mile-long concrete apron 400 ft. wide extending across the entire front of the administration building and hangars. On this there is ample room for loading or unloading 12 big air liners at the same time. With a minimum fair-weather interval of 2 min. between machines 720 flights could be operated in and out of the airport in 24 hrs., a capacity sufficient for several years ahead. The runways are well lighted for use at night, and the latest equipment for blind flying is provided.



One of the huge landplane hangars at La Guardia Field.

The seaplane base is at the extreme western section of La Guardia Field, with its administration building on the shore of Bowery Bay. This building is circular, 144 ft. in diam., and three storeys high, and has two rectangular one-storey wings at its bay side. Through one of these wings a corridor with waiting rooms on the sides leads to the passenger ramp that connects the terminal with a landing float in the bay. An outside observation platform extends around the building at the third floor level, and on the roof is equipment for upper air observation.

The seaplane hangar is a big structure with five sides, four of which provide openings for seaplanes and flying boats. Each opening is covered by a huge electrically-operated door similar to those of the landplane hangars. Machine shops are on the fifth side of the building. A concrete ramp enables the aircraft to be hauled to and from the bay and hangar.

The Life-Boat Service in Wartime

THE work of the National Life-Boat Institution is strenuous in times of peace; in wartime it is far more so. During the first 18 months of the present war life-boats have saved 3,526 lives; that is to say they have saved more lives in this period than during the last 10 years of peace. The greatest of the many services of the life-boats to the fighting forces was that rendered in helping to bring off the British Expeditionary Force from Dunkirk. In this work 19 life-boats took part and helped to bring off thousands of men. All 19 boats were damaged; one never came back.

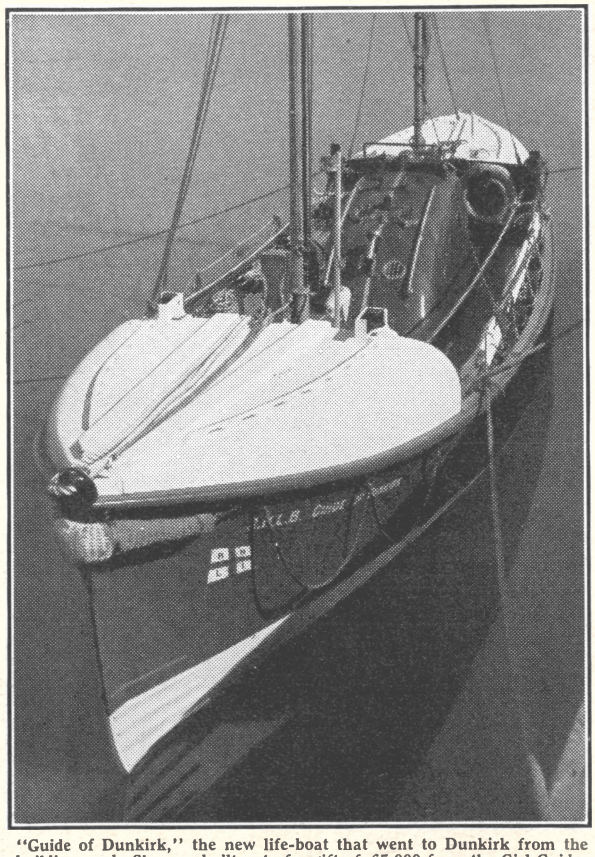
The story of the services rendered by the life-boats at Dunkirk and elsewhere is told in an interesting publication, *"The Life-Boat Service and the War; The First Eighteen Months,"** recently issued by the Royal National Life-Boat Institution. This splendidly illustrated book is full of stirring tales of rescues under enemy fire and in the wildest storms.

The work of taking off the troops from Dunkirk began on 26th May, and on the 30th the Admiralty asked for every boat that could be collected in 24 hours in all English ports from the Humber to Southampton. They came at once, something like a thousand of them—tugs, trawlers, drifters, launches, motor barges, sailing barges, yachts—and life-boats of the Royal National Life-Boat Institution. The first two life-boats to reach Dunkirk were the *"Prudential"* of Ramsgate and the *"Lord Southborough"* of Margate, both of which went direct from their stations.

The Ramsgate life-boat under Coxswain H. P. C. Knight, with a crew of eight, left at 2.20 in the afternoon, having in tow eight boats, mostly wherries, loaded with cans of fresh water for the troops. She reached Dunkirk at eight in the evening, and found seas breaking in water so shallow that the boat could not get close to the shore. She lay off, and life-boatmen manned the wherries and rowed in through the surf. They landed the cans of water and then began the work of taking off the men. Each of the wherries took eight at one time, and rowed out through the surf to the life-boat which, in turn, as she was loaded up, put out to larger vessels lying farther off in the darkness, and transferred the men to them. Then back to the waiting wherries, and so on through the night to the accompaniment of falling shells and bombs. The life-boat brought off about 800 men that night. She went on all through the next day and night until 1.30 on the following morning, by which time she had taken off another 2,000 men, and the eight wherries had all been sunk. There was no more that she could do, and so she returned to Ramsgate.

The Margate life-boat under Coxswain E. D. Parker got across to the beaches near Nieuport. There in the darkness the coxswain heard a voice calling from the shore. He took the life-boat in as close as he could, and French soldiers waded out to her up to their armpits. The life-boatmen dragged them on board and took them out to an accompanying barge. Other loads of men were then taken off and put aboard a destroyer lying farther out. This went on until the weather became so bad that it was impossible for the troops to reach the life-boat through the heavy surf, and she then made for home. On her way she picked up from a whaler 17 men who were all that remained of a party of 150 who had been working on the beaches for four days. She reached Margate safely after being out for over 21 hours, having brought off from the beaches about 600 men.

Coxswain Knight of Ramsgate and Coxswain Parker of Margate were both awarded the Distinguished Service Medal for their gallantry and determination. There could be no finer tribute to the work done by these boats than the following words quoted from the commander of a destroyer who saw the Margate men at work: "The manner in which, with no thought of rest, they brought off load after load of soldiers, under continuous shelling, bombing and aerial machine-gun fire, will be an inspiration to us all as long as we live."



"Guide of Dunkirk," the new life-boat that went to Dunkirk from the building yard. She was built out of a gift of £5,000 from the Girl Guides of the Empire, and is to be stationed at Cadgwith, Cornwall.

Our striking cover this month shows Coxswain Parker of Margate at the wheel.

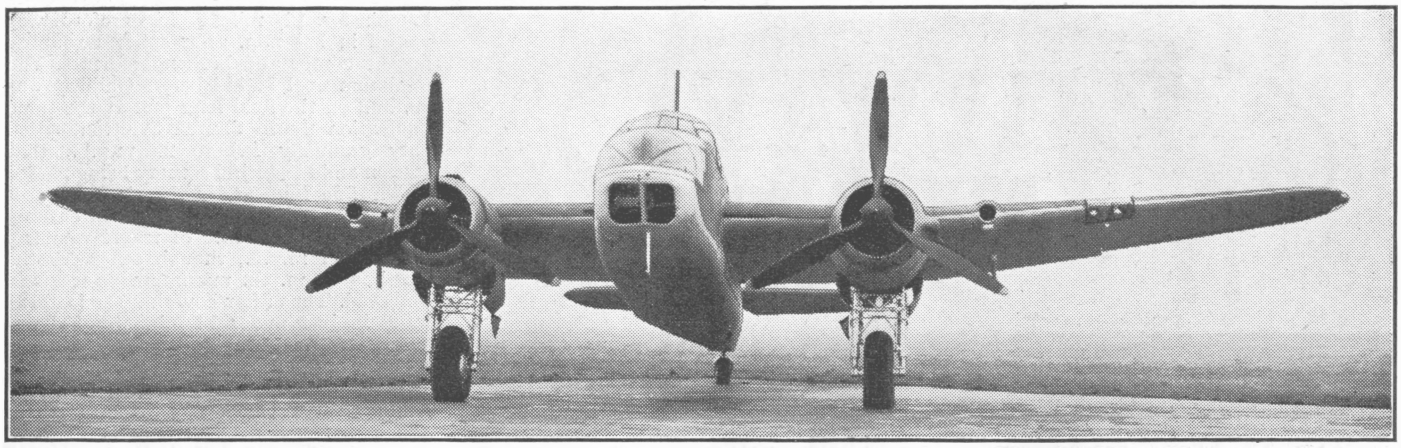
In the midst of the new perils of war it is easy to forget that the old perils of the sea remain. In the first 18 months of war there were 928 launches of life-boats to vessels in trouble on account of the war, but in addition there were 741 launches to vessels in distress from the ordinary dangers of the sea. The finest rescue of these months of war, and one of the finest in the whole history of the life-boat service, concerned a steam trawler driven ashore as she returned home from the fishing grounds. For that rescue the King awarded the coxswain of the life-boat the George Medal, and the Institution awarded him its gold medal. The trawler was the *"Gurth"* of Grimsby and the life-boat the *"City of Bradford"* of the Humber. The coxswain was Robert Cross, who has now won the Institution's medals for gallantry six times.

The *"Gurth"* was driven ashore near the Humber on a night of February 1940. The night was very dark and cold; it was snowing heavily, and the wind was blowing with fierce squalls. The trawler lay with her bows on shore, and the seas were breaking over her quarter and sweeping along her deck. Two of the life-boat's crew, at that remote station at Spurn Head, were ill, and there was no one to replace them. The life-boat had to put out with only six men, and the whole rescue had to be carried out in darkness, for the coxswain had not a man to spare to work the searchlight.

The seas were breaking continuously over the life-boat. The motor mechanic, standing in the after-cockpit at his engine controls, was just able to keep his chin above water. Repeatedly the men were knocked down by the seas, shaken and bruised, and only saved from being swept overboard by clinging to the handrails as they were flung across the deck. But again and again in the darkness and heavy snow the life-boat worked her way alongside the trawler, was lifted high above her and nearly flung on her deck. She could stay alongside only for a moment. Two life-boatmen were ready, and in that moment they had seized a man and dragged him aboard. Then she went astern. Sometimes she had to go astern with no one rescued, and it was all to do again. One by one six of the nine men of the trawler had been rescued when the port engine of the life-boat stopped. A rope had been washed overboard and had got round the propeller. It was impossible to cut it away. With only one engine running—and the danger doubled—the life-boat went in again and yet again, until one by one the last three of the nine men had been rescued.

The life-boat's dangers were not yet over. Before she could move out of the broken water her stern had hit the bottom several times and her rudder was split, but she was still under control. She moved seaward; the scuttle over the port propeller was lifted and the rope round it was cut away. Then she made for Grimsby, where she arrived at eight next morning, having been out for 11 hours. Her crew were more exhausted than the rescued men.

**"The Life-Boat Service and the War; The First Eighteen Months." Royal National Life-Boat Institution, Life-Boat Depot, Boreham Wood, Herts. Price 1/- post free.*



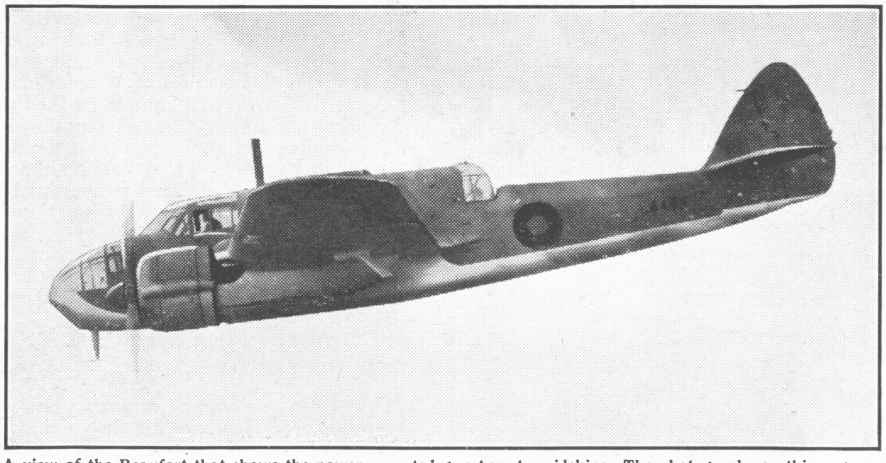
"Bristol" Beaufort general purpose monoplane.

The "Bristol" Beaufort

A Fine R.A.F. General Purpose Aircraft

SINCE taking its place in the war equipment of the Royal Air Force the "Bristol" Beaufort has frequently been mentioned in Air Ministry communiques. It is designed for bombing, general reconnaissance, torpedo bombing, and for use as a general purpose landplane, and it has proved to be a great success.

As bombers Beauforts have attacked such targets as the German battleships "*Scharnhorst*" and "*Gneisenau*" in dock at Brest, and other harbours, docks, aerodromes, and gun positions of the enemy. Cherbourg and other Channel ports, Antwerp, Ymuiden, Flushing, and Norwegian waters, have been the scenes of swift offensive actions by Beauforts of the Bomber and Coastal Commands—powerful, low-flying attacks made possible by the machines' exceptionally high speed combined with relatively heavy bomb load.



A view of the Beaufort that shows the power-operated gun turret amidships. The photographs on this page are by courtesy of The Bristol Aeroplane Co. Ltd.

The Beauforts have also done fine work as torpedo carriers, and on the 13th June last one of them flying near the Norwegian coast torpedoed a pocket battleship that was "protected" by five destroyers. On several occasions the machines have flown down to within 50 ft. of the sea to launch their deadly attacks, and they have taken heavy toll of enemy transports and supply ships by this latest form of aerial warfare. On reconnaissance, too, they have been of the utmost assistance to the Royal Navy, and in helping to convoy our merchant fleets they have been playing a valuable part in the great Battle of the Atlantic.

In view of this consistently high performance it is specially interesting that the Beaufort is an all-"Bristol" product, the airframe, engines, and the power-operated turrets being designed and constructed by The Bristol Aeroplane Co. Ltd. It may also be mentioned that after careful consideration the Australian Government chose this machine for manufacture under the Government scheme in the Commonwealth, and the first of these aircraft produced in their factories have already flown.

The Beaufort carries a crew of four, consisting of the pilot, bomb-aimer or navigator, wireless operator, and gunner. The pilot, with his controls and equipment, is accommodated on the port side, at a higher level than the walk-way that extends from the extreme nose of the fuselage to amidships. On the starboard side and just behind the pilot there is a table for the navigator or bomb-aimer, together with a seat that can be stowed under the table when not in use. The wireless station and operator's seat are located between the main spars of the wing centre section, and the gunner occupies a turret amidships in which are twin guns and an automatically adjusted seat. In addition to forward-firing guns and those in the turret, another version of the Beaufort has a backward-firing gun in a little "blister" turret under the starboard part of the fuselage nose. This gun is remote-controlled and is aimed with the aid of mirrors. Details of the bomb and torpedo loads carried are not available.

The crew enter the machine through a hatch reached by means of a retractable ladder just forward of the gun turret. In an emergency they can bale out through emergency exits provided in the floor and roof of the fuselage nose.

The exceptionally complete equipment carried includes navigational, photographic, and radio apparatus, and equipment for operating in the desert. There is also a collapsible dinghy for use in case of a forced descent on the water.

The Beaufort is the latest addition to the range of high-speed twin-engined mid-wing monoplanes employed by the Royal Air Force. It is an all-metal machine, of course, with stressed-skin covering of Alclad sheet. The main plane is built in three sections, port and starboard wings and a centre section that is passed through the fuselage and bolted to it. The two "Bristol" Taurus engines are mounted low in the leading edge of the wing centre section, with the tops of their cowlings level with the upper surfaces of the wings. Each of these sleeve-valve radial engines is nominally rated at 1,065 h.p., and drives a constant-speed airscrew. The exhaust collectors form the leading edge of each cowling, and controllable gills governing the flow of cooling air are fitted round the trailing edge. This cooling air is collected by a ducted opening in the leading edge of each wing. Fuel is carried in four main tanks, two in the wing centre section and one in each wing. The exact range of the machine cannot be given, but it is known to be greater than that of the "Blenheim," which is 1,900 miles.

RAILWAY NEWS

The Last Webb Compounds

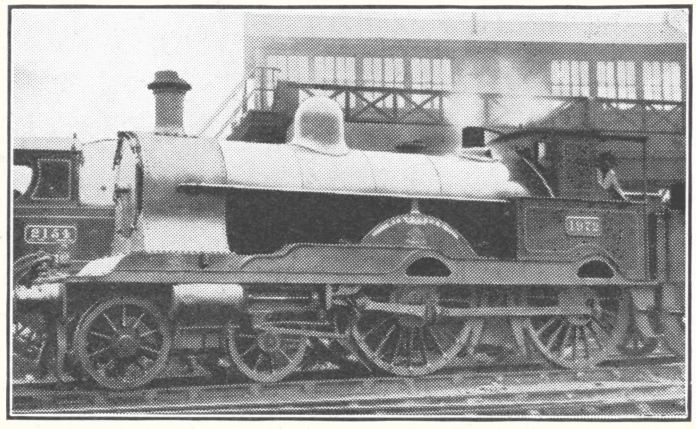
The name of the late Mr. F. W. Webb will ever be associated with his large-scale development of compound engines for the former London and North Western Railway, of which company he was Locomotive Superintendent from 1871 to 1903. These engines aroused considerable controversy, as they were very variable in performance. His 2-4-0 and 2-4-2 locomotives were really 2-2-2-0 and 2-2-2-2 respectively, since the driving wheels were uncoupled, deriving their propulsion separately from the high or low-pressure cylinders.

Just 40 years ago, when corridor carriages were becoming commoner and passenger traffic was increasing considerably, with consequent increase in train weights, Mr. Webb was building his last and probably most successful compound classes, comprising 4-4-0 4-cyl. coupled engines with large driving wheels 7 ft. 1 in. in diameter. First came the "Jubilee" or "Black Prince" class, of which there were 40 examples numbered 1901-40. The two high-pressure cylinders were outside the frames, and the two low-pressure ones inside. The size of the latter, 19½ in., or afterwards 20½ in. in diameter, with a stroke of 24 in., seemed much more suitable than the 30 in. diameter hitherto employed for the single low-pressure cylinders of the 3-cyl. engines. On *"Iron Duke"* and subsequent compound locomotives the boiler pressure was raised from 175 to 200 lb. per sq. in.

Next came the "Alfred the Great" or "Benbow" types, of which there were 40, Nos. 1941-80. They had considerably larger boilers. The high-pressure cylinders, at first of 16 in. diameter, were soon reduced to a diameter of 15 in., that of the low pressure cylinder remaining at 20½ in. These engines, carrying grand old battleship names now familiar on Stanier "Jubilee" 4-6-0s, handled heavy loads for the period though never attaining high speed, but were erratic performers and there was much double-heading. An improvement was the plan whereby the high-pressure cylinder valve gear on many of the later engines, commencing with *"Benbow,"* could be linked up separately.

Mr. Geo. Whale, who succeeded Mr. Webb at Crewe in 1903, successfully rebuilt many of these compounds as 2-cyl. simples on similar lines to his new and larger "Precursor" 4-4-0 class. All the other Webb express engines were gradually scrapped, and the last of the converted 4-4-0s was withdrawn about 10 years ago.

Our illustrations are reproduced by courtesy of the Stephenson Locomotive Society.



An "Alfred The Great" four-cylinder compound of the former L.N.W.R.

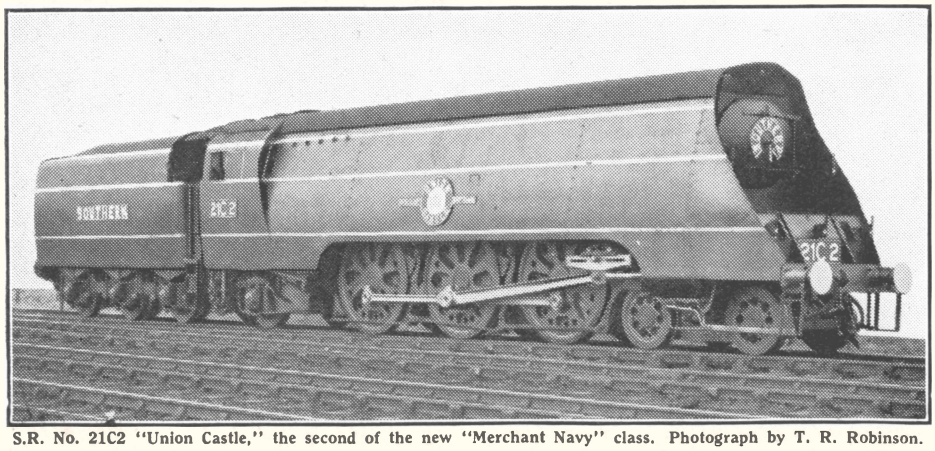
Fine "Castle" Running over Steep Gradients

Excellent work is being done by the G.W.R. "Castles" with heavy loads at booked speeds not greatly inferior to peace schedules over the steeply-graded West to North main and joint lines between Bristol, Newport and Shrewsbury.

No. 5032 *"Usk Castle,"* with a crowded train weighing 450 tons behind the tender, northbound from Bristol, after a maximum of 62 m.p.h. at the lowest part of the Severn Tunnel sustained 26 m.p.h. up the steep 1 in 90 from the Welsh exit. Delays ensued on the stages to Newport and Hereford, which prompted some magnificent recovery work along a difficult road, 8½ min. being regained to Shrewsbury. Leominster, 12½ miles from Hereford, was passed in 17¼ min. after spirited running up the climbs and broken gradients. The minimum up 1 in 112 before Onibury was 39, and on the final long pull at the same inclination up to Church Stretton, speed only gradually fell to 27 m.p.h., that station amid beautiful scenery being passed in the fine time under the circumstances of 49¾ min. for 38¼ miles. Down the ensuing steep descent the rate of travel went up once to 71 m.p.h., though otherwise the wartime 60 m.p.h. maximum was closely observed. Thus after covering the last 12¼ miles in just under 14 min., Shrewsbury was reached in 63½ min. compared with the 72 min. allowed in the time table.

In the opposite direction 5072 *"Compton Castle"* (since renamed *"Hurricane"*) with 445 tons made a grand climb to Church Stretton, 12¾ miles in 21¾ mins., speed being well sustained at 33 m.p.h. up the final 1 in 100. Gentle running followed down the long descent, yet thanks to the fine start, the net time to Hereford allowing for signal delays outside was only a minute over the pre-war 65-min. booking. Good locomotive work was displayed again on the following stages of hard going, such as a minimum of 34 m.p.h. on the 1 in 100 to Llanvihangel, so that several minutes were regained to Pontypool Road. Up the final pull from the Severn Tunnel towards Bristol the engine proved her gameness by clearing the first 3 miles at 1 in 100 at 36 m.p.h., getting up to 42 m.p.h. on the short Pilning level stretch, then settling down to a minimum of 34 m.p.h. again on the next 3 miles of 1 in 100, so that in spite of some concluding signal checks the awkward 15 miles from Severn Tunnel Junction to Stapleton Road, Bristol, were covered start to stop in 22½ min. and more time had been recovered, which was decidedly to the credit of the engine and crew under the present difficult conditions.

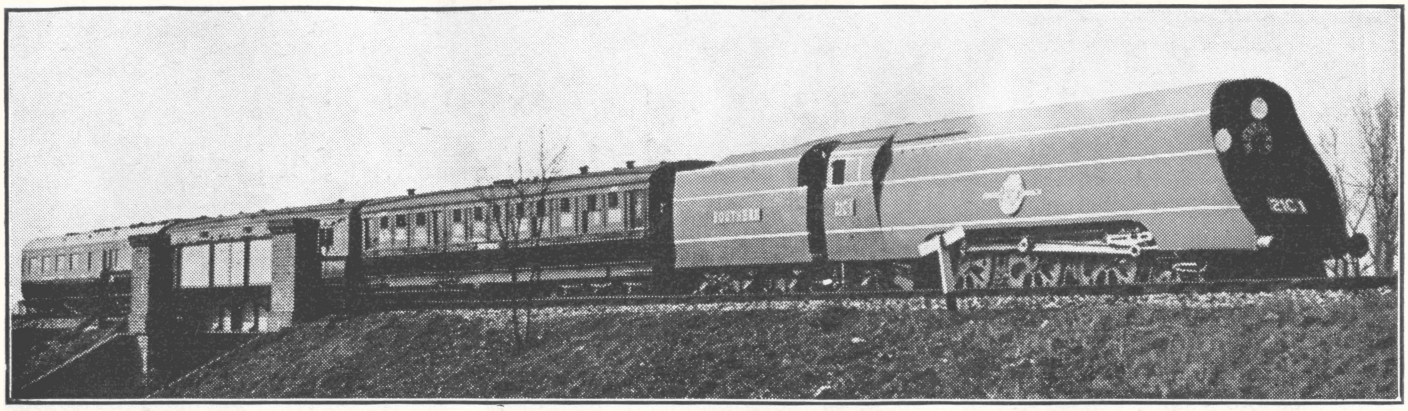
These runs were logged by Mr. O. S. Nock.



S.R. No. 21C2 "Union Castle," the second of the new "Merchant Navy" class. Photograph by T. R. Robinson.

Novel L.N.E.R. Aids to War Weapons Week

The large clock that for many years was suspended above two of the main line platforms at Liverpool St., but was temporarily removed for reasons of safety, was converted during London's War Weapons Week into an office for the use of local organisers. Notice boards were fitted in the dials, and a considerable space was available within this novel sanctum. Selling kiosks were set up at the principal termini, while at Liverpool St. and King's Cross the company's loud-speaker equipment was placed at the disposal of propaganda officials.



S.R. No. 21C1 "Channel Packet" at the head of a train. This air-smoothed locomotive is the first S.R. "Pacific." Photograph by courtesy of the S.R.

Centenary of a Famous Tunnel

It is just 100 years since the opening for traffic of the 10 miles of railway on the borders of Lancashire and Yorkshire, through wild and difficult country, on which occurs the famous Summit Tunnel, cut through the Southern Pennines. The route is now part of the L.M.S. Central Division, formerly the Lancashire and Yorkshire Railway, and is on the main line between Manchester (Victoria) and Leeds. At the time of its construction, Summit Tunnel was the longest and one of the most noteworthy in England, being 1 mile 1,125 yd. in length. It is sometimes called Littleborough Tunnel, as that place is at one end.

The cost of building the tunnel was about £300,000, and 8,000 tons of cement and 23 million bricks were utilised. About 1,000 men were employed on the work, which lasted for 2½ years and was a task of considerable magnitude and danger. The maximum depth below ground is 300 ft.

The first signal box on the former L.& Y.R. fitted with electric block telegraph apparatus was at Walsden, controlling traffic at the eastern end of this tunnel, having been brought into use in 1874. In each direction of approach there are long and partially steep gradients leading up to the tunnel.

S.R. Locomotive Painting

For reasons of economy, all S.R. mixed traffic, goods and passenger engines of older types are to be painted black unlined. Examples that recently left the works are already at work "dressed in sombre guise." Light green is the colour scheme for "Pacifics," "Lord Nelsons," "King Arthurs" (including the "Remembrance" class), and "Schools." While present stocks of olive green paint last, however, certain of the next most important types of passenger engine will be painted the old shade.

The new style of lettering with numbers on cab or bunker side is now standard, so that in general the plan adopted will be similar to present L.M.S., and L.N.E.R. practice.

L.M.S. Rhymed Salvage Appeal

In furtherance of the company's salvage scheme and to make it all-embracing, two striking coloured posters have been displayed in stations, depots, offices etc., bearing verses urging the need for avoiding waste. The following is the text of the rhymed appeal to save as much paper and cardboard as possible:—

Put litter in the basket
And never on the track;
Keep the platform tidy
Soon you'll get the knack.
Then papers by the dozen
And cartons by the score,
Carefully collected,
Will help to win the war!

What have you salvaged to-day?

One-Day Season Tickets for H.M. Forces

The London Passenger Transport Board issues all-day season tickets to members of H.M. or Allied Forces on leave in uniform in London. These tickets cost 1/– and are available for unlimited travel from 10-30 a.m. to close of traffic on the same day. They are available over practically all the "tube" routes and Metropolitan and District lines in the Central and many suburban areas, as well as all London trolley bus, tram and omnibus services stretching out long distances in all directions. Travel by trains owned by the four main line companies is not included.

Extension of North London Electric Lines

As part of the joint L.N.E.R.-L.P.T.B. electrification plan "tube" trains from Morden, Surrey, via London West End stations, now run through to Mill Hill on the former Edgware branch of the L.N.E.R. which until recently was a steam single line. Through workings by this route to Edgware will follow later, when the necessary track and other alterations are completed. Electric working to High Barnet was instituted last year, with "tube" trains running through on to the G.N. section, L.N.E.R., near East Finchley.

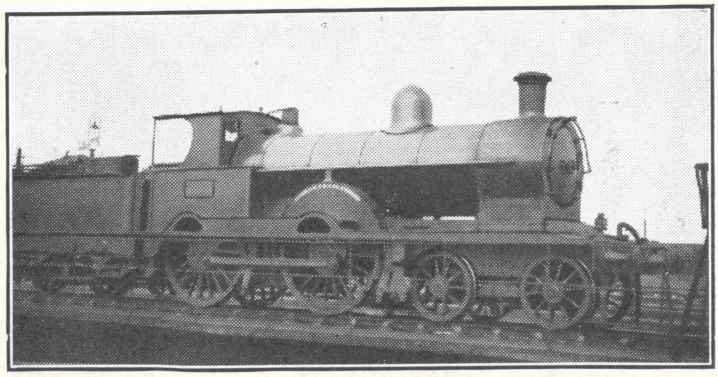
British Summer Time Tables

Each of the four main line companies brought their summer time tables into operation on the same date this year. Frequent holiday expresses or very long non-stop runs cannot be expected just now, but the standard wartime services have been augmented where necessary and more sleeping and refreshment cars provided. Speeds remain at about the same level as those operating last year. Six long-distance restaurant-car expresses leave Euston every weekday between 10 and 10-40 a.m. Similarly from King's Cross there are batches of four northbound between 9-30 and 10-10 a.m., and also from 12-45 to 1-25 p.m. Uninterrupted periods are thus available in between for freight train running.

From Paddington the close succession of variously destined fast trains leaving at 5-minute intervals between 5-55 and 6-10 p.m. is maintained. The 3-55 p.m. South Wales express has been restored, and several important trains are regularly run in duplicate. More Waterloo main line services on the Southern now call at Woking in each direction, in order to connect with outer suburban trains. Many of the timings on this system still bear a striking resemblance to those of 1939.

The Stockholm Railway Museum.

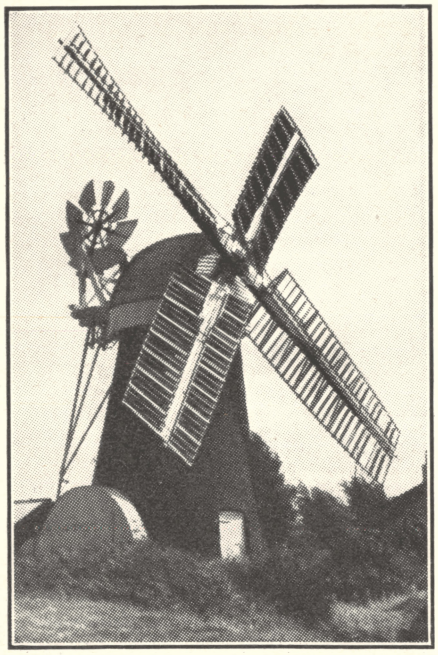
In the State Railway Headquarters at the Central Station, Stockholm, is a fine collection of models, documents and relics that have been gathered together during the past 25 years to portray the early history and general development of railways in Sweden. There are models of all the principal types of rolling stock in use since 1856, as well as a fine electrically-operated replica in miniature of the great Arsta Bridge, with model signals and automatic train control. This bridge is of the arch type, with extensive approach viaducts, and carries the railway over a river in the suburbs of Stockholm. Within separate buildings, comprising old sheds as at York, are housed a number of interesting old locomotives, including a Beyer Peacock "single" of the class known as the "*Spinning Wheels*," painted bright green and embellished with much polished brass work. Among the old vehicles exhibited is also an ancient English-built three compartment, four-wheeled carriage.



A Webb four-cylinder compound of the former L.N.W.R. after rebuilding as a two-cylinder simple by Mr. G. Whale.

* * * *

The longest stretch of straight track in the United States is on the Seaboard Railway between Wilmington and Hamlet, North Carolina, a distance of 79 miles.



"A Fine Old Drainage Mill"—A. G. Dell, London S.E.27.

Photography

Looking for Interesting Subjects

I HAVE often heard my young photographer friends grumbling about the lack of interesting subjects for their cameras within easy distance from their homes, and complaining that there is nothing exciting or attractive to occupy their time and films. It is quite true that opportunities for pictures are limited by restrictions due to the war, and that many favourite subjects are now entirely prohibited. Nevertheless there are still plenty of interesting pictures to be got, the only difference is that they have to be looked for more carefully than in peacetime.

We are asked by the government to travel as little as possible this year, and therefore many of us will be spending our holidays at home, or at any rate not far away. Here is an opportunity of finding out how little we really know of our own neighbourhood! Take a walk with a friend along the familiar ways with the definite object of looking for suitable subjects for pictures. Do not take your cameras on this preliminary survey. Turn the walk into a game by challenging your friend to beat you at finding subjects, and you will be surprised at the results. Explore every side road. If there is nothing interesting to be seen ahead, try an old tip of mine—turn round and look in the opposite direction; this often reveals something quite unexpected and interesting. Make a note of your picture "finds," and when you return home pick out the best of them and tackle them with your camera on the next opportunity. As regards prohibited subjects, just use your commonsense. If you have any doubt about a particular scene cross it off your list at once, and so avoid any possibility of trouble. Several readers have written to ask me whether there would be any objection to their photographing a certain subject on which they were keen, and I have been able to advise them. I shall be glad to do this for any reader, so send along your queries as they crop up.

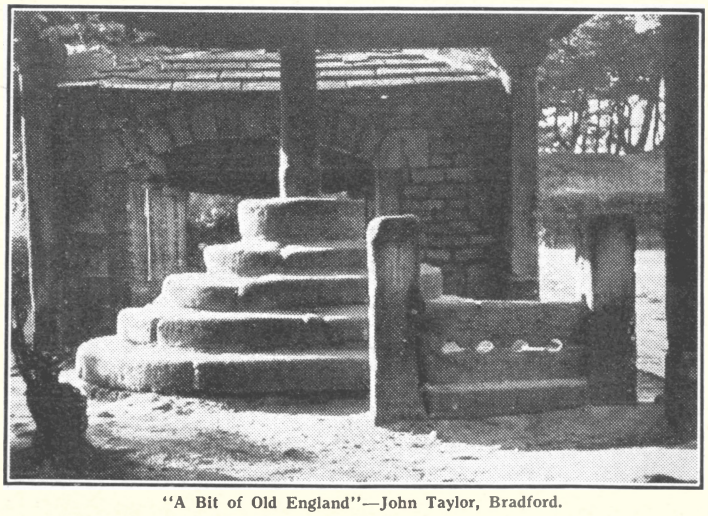
If you are fortunate enough to get further afield into a new district your opportunities will be greater; but here again my advice is to make a preliminary survey before setting to work with the camera. And now for another tip worth remembering. When you come across an interesting bit that you think will provide a good picture, make a note of the time, and try to return to it with your camera at about the same hour. A scene that looked very attractive in the morning, for instance, may be quite dull in the afternoon, because the position of the sun has changed.

Do not be tempted to try to make pictures of wide stretches of country or sea, with nothing in the immediate foreground; the results are always disappointing and practically useless. Generally speaking the smaller the area included in the view the better, especially with a small camera. Always arrange to have in sharp focus something interesting in the foreground, and then the more distant parts of the picture will look after themselves. A picture of a wide expanse of beach, for instance, is always unsatisfactory because there is no centre of interest. But if you arrange to have a small group of people in the near foreground the result is quite different and often very attractive.

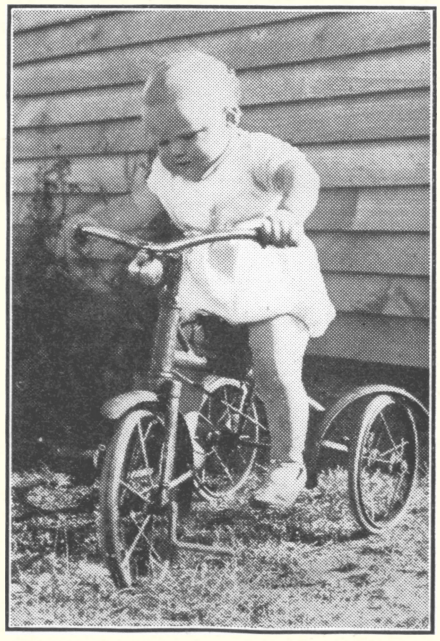
In spite of every care, however, the majority of snapshots include more than is either necessary or desirable, and this can be got rid of by trimming. Try covering up with strips of paper bits of the top or bottom or one or both sides. Move the strips about until you have isolated the best part of the picture; then trim away all that is not wanted. The result is almost always an improvement.

The pictures on this page are good examples of the kind of subject that can be tackled with any camera.

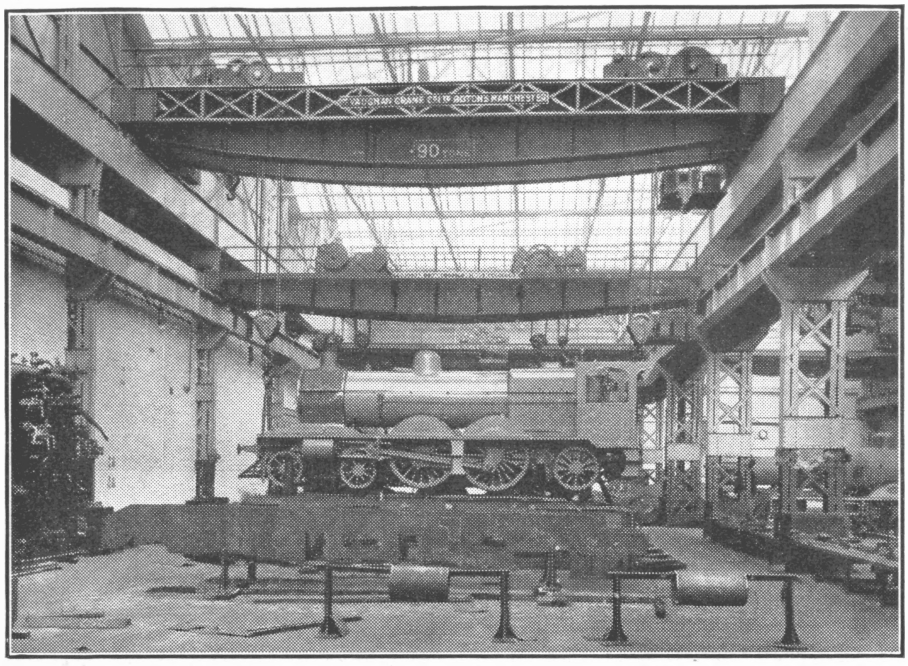
Another interesting photograph by J. Taylor, Bradford, who titles it "Spring in the City."



"A Bit of Old England"—John Taylor, Bradford.



"If only I could reach those pedals!" This child study is the work of L. W. Humm, Geraldine, New Zealand.



A scene in a British locomotive works, showing a Vaughan 90-ton overhead travelling crane lifting a 4-4-2 type locomotive. Photograph by courtesy of the Vaughan Crane Co. Ltd., Manchester.

ENGINEERING NEWS

Shaft Sinking Record

By sinking a six-compartment shaft 454 ft. during a single month, a world's record for shaft sinking has been established at the new deep shaft on the West Rand Consolidated Mine, Krugersdorp. During one month last year the shaft was sunk 441 ft., which beat the record for a six-compartment shaft held by the Vlakfontain mine since 1936.

A Portable Welding Plant

One of the most striking of the advances in engineering practice in the last 20 years has been made in welding, and in this development Metropolitan-Vickers Electrical Co. Ltd., have played an important part. They manufacture welding plants suitable for all kinds of work, much of which is highly specialised. In the lower illustration on this page is seen a 50kVA machine that can be be used for welding in either vertical or horizontal positions. Pressure on the welding electrodes is obtained hydraulically and by compressed air, and can be applied up to a maximum of 500 lb. In the background of the illustration can be seen a special automatic controller that relieves the operator of all responsibility for consistent welding.

Cement-Making Plant for Iraq

A British engineering works recently completed, and despatched to Iraq, plant for the first cement works to be built in that country. The equipment includes machinery for crushing limestone, mills for grinding limestone and clay, and a rotary kiln 300 ft. long for burning and processing the raw materials. There is also another large mill for making the finished cement, and a machine that automatically packs the product in paper sacks. When the works is operating at full capacity it will be able to turn out approximately 250 tons of cement a day.

New Use for the "America"

The fine passenger liner *"America,"* which was completed in July 1940 by the Newport News Shipbuilding and Dry Dock Company, Newport News, for the service of the United States Lines Company, has been acquired by the United States Navy for conversion into a naval transport vessel or an aircraft carrier. The *"America"* is 723 ft. long and has a gross tonnage of 27,000. The propelling machinery consists of twin sets of geared turbines having a designed output of 17,000 s.h.p., and driving two propellers at about 128 r.p.m. A description of this ship appeared in the *"M.M."* for July 1940.

A New Diving Suit Invention

By pumping helium-oxygen gas to divers instead of ordinary air, deeper and more effective deep-sea diving has been made possible. With this mixture the diver is less subject to the disease known as the "bends," but he suffers much more from the cold than he does when he breathes ordinary air. When the helium-oxygen mixture is used therefore it is necessary to supply artificial heat within the diver's suit and this is done by means of electric heating elements. Unfortunately, however, this practice has been dangerous owing to the possibility of short circuits, which could easily prove fatal because of the diver's contact with salt water.

Recently a new insulating material has been introduced that entirely eliminates this danger. It is known as Fiberglas, and is composed entirely of glass. This new development was announced recently at a demonstration by the United States Navy's Experimental Diving Unit in the Washington Navy Yard. This Unit has long been associated with pioneer work in the development of submarine and diving safety devices.

Concrete Poles for Electricity Supply

Electricity supply companies in South Africa are experimenting with concrete poles in order to reduce the consumption of steel. The type of pole approved for use near towns, where the height, spacing and loads are more or less fixed, consists of three cylindrical legs braced with collars at intervals, and merging into a single cylindrical top portion. Using these units, poles can be built up to any required height with little or no change in the size of the concrete members, and the necessary resistance to any specified pull can be obtained by varying the reinforcing and the spacing of the three legs.

Awards for Beautiful Bridges

The American Institute of Steel Construction has appointed a committee to select the most beautiful steel bridges completed and opened to traffic during 1940. The committee will make its selections on the basis of photographs submitted as entries, and will award four stainless steel plaques for attachment to the bridges they consider to be the most beautiful in the following four classes: Class A, bridges costing £200,000 or more to build; Class B, bridges costing from £50,000 to £200,000; Class C, bridges costing less than £50,000; Class D, all movable bridges.

A Powerful Press

Armourplate steel undergoes various forms of heat treatment during the process of manufacture, and sometimes becomes warped and must be brought back to shape. An American engineering concern has recently designed a press specially adapted for straightening such metal. The new machine is tremendously powerful and is capable of dealing with plate up to 2½ in. in thickness. The ram of the press operates at from 20 to 40 strokes per min., depending upon the thickness of the plate being dealt with, and up to several hundred strokes may be required.

A "M.V." portable spot welding machine in operation. Photograph by courtesy of Metropolitan Vickers Electrical Co. Ltd.

Railway Working in Australia—Part I

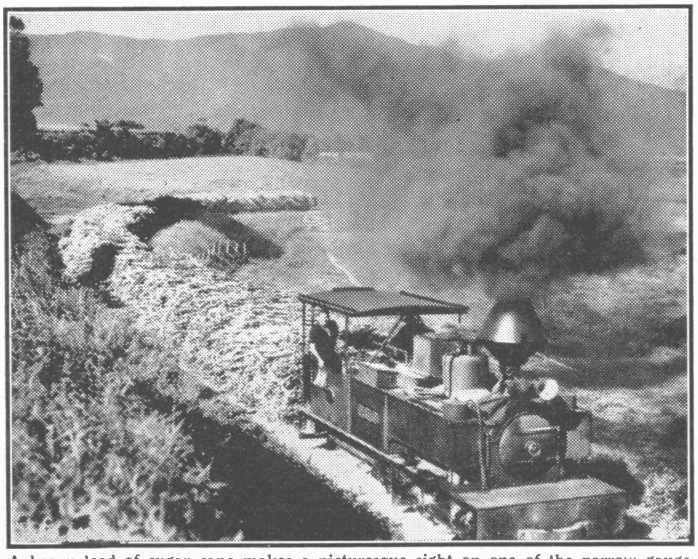
By "A Railway Engineer"

IN studying Australian railway operation it is necessary, at the very outset, to form a general picture of the system as a whole, otherwise an entirely wrong conception may be gained. The striking developments of recent years—streamlined locomotives, intense suburban working, luxurious transcontinental trains—tend to give the impression of a railway network something like our own, whereas these ultra-modern activities are mainly confined to relatively small areas. In each of the individual States forming the Commonwealth the railways are, with one exception, run by the State Government concerned; these lines were projected and built before the formation of the Commonwealth, and each State went ahead with its own ideas, with little or no reference to the doings of its neighbours. The railways gradually spread out fanwise from the respective capitals, yet evidently with little intention of their eventual linking up into one great system.

One might have imagined that the difficulties arising from different gauges had been demonstrated forcibly enough at home, by the experience of the Great Western Railway; yet in Australia an even greater diversity was allowed to grow up. While New South Wales adopted the British standard of 4 ft. 8½ in., her northern neighbour, Queensland, used 3 ft. 6 in., and Victoria decided upon 5 ft. 3 in., so that in the 1,300-mile journey from Brisbane, through New South Wales to Melbourne there are two breaks of gauge. South Australia was divided even within itself; a considerable mileage in this State was built on the 3 ft. 6 in. gauge, though fortunately the main lines radiating from Adelaide were 5 ft. 3 in., thus linking up conveniently with the Victorian system. The famous *"Inter-State Express,"* between Adelaide and Melbourne, was one of the first fruits of this co-operation. Finally there was the 3 ft. 6 in. system of Western Australia, for many years completely isolated from the rest of the Continent, with upwards of 1,000 miles of railway-less country between its eastern-most point and the nearest part of the South Australian system.

In addition to the trunk lines there are, in the more isolated parts of the country, light railway systems on the 2 ft., or 2 ft. 6 in. gauge, acting as feeders to the larger concerns. A picturesque example of one of these is shown in the illustration on this page, of a light railway in Queensland; the train is so fully loaded up with sugar cane that the wagons are invisible! In Victoria, too, narrow gauge railways are used in the timber districts, the locomotives, as in the Queensland illustration, being fitted with spark-arresting chimneys. The main lines of the Queensland Government Railways were originally laid fairly lightly, with rails weighing only 41¼ lb. to the yard, and many of the timber bridges on the system permitted a maximum axle load of only 8 tons; the sparse traffic, and the need for cheapness in construction doubtless prompted the choice of the 3 ft. 6 in. gauge.

But although the density of traffic is in no way comparable even to that found on the neighbouring lines in New South Wales and Victoria, the Queensland Railways are characterised by their long-distance trains, both passenger and goods. From Brisbane northward there is a continuous line along the coast to Cairns, about 800 miles away, and from this three long routes run westward to the interior. On these latter there is a steady flow of traffic to the coast. From the pastoral lands furthest from the sea come wool and livestock trains; and from other districts dairy produce, wheat and cotton, together with a certain amount of minerals, provide the chief loads for coast-bound goods trains.



A heavy load of sugar cane makes a picturesque sight on one of the narrow gauge lines in Queensland. Photograph by courtesy of The High Commissioner for Australia.

Nearly all the traffic is from west to east, and in consequence a large amount of empty stock has to be hauled in the opposite direction. The Queensland Railways make quite a speciality of long-haul livestock traffic. It is quite a usual thing for cattle to be conveyed over 1,000 miles by rail; special roofless trucks are used, each taking 17 or 18 head, and arrangements are made for the beasts to be detrained at one or two places en route, and spelled for a day or two before reloading.

From the point of view of through traffic between Queensland and New South Wales it is fortunate that Brisbane, the capital, lies comparatively near to the State boundary. There has recently been opened a new line, 69 miles long, on 4 ft. 8½ in. gauge from Brisbane to Kyogle, so that through running is now possible between Queensland and New South Wales. Previously the State boundary was crossed at Wallangarra on the inland route, and involved a somewhat circuitous journey of over 100 miles on the 3 ft. 6 in. gauge before changing to the standard gauge New South Wales train.

Before leaving the Queensland Railways I must mention, too, the wonderful branch line running inland from Cairns, in the north, over the Cairns mountain range to Ravenshoe. It is quite a short line, as Australian routes go, 104½ miles in all; but it includes some of the grandest mountain scenery passed by any railway in the Commonwealth. The 3 ft. 6 in. gauge track winds through tremendous gorges; past the majestic Barron Falls, where the river drops 900 ft.; in the very spray of other waterfalls, on sharply curving viaducts which, by the way, have no parapets. For a short distance this line is indeed fit to rank as one of *the* scenic railways of the world.

Mountain routes also are a marked feature of the railways of New South Wales, though here, on the standard gauge, the main lines are of altogether more substantial construction, 90 lb. rails being used, and in places even 100-pounders. The Government of New South Wales operate the busiest and most important system in Australia, all the time under very awkward physical conditions. Quite near to the coast, behind the populous cities of Sydney and Newcastle, run the lofty ranges of the Blue Mountains, and on routes running westward to the plains, which carry a substantial traffic in livestock, farm produce, and so on, very hard climbing is involved. When the Great Western line was built, traffic was scarce and money scarcer, and to lessen the cost of construction in the Blue Mountains the famous "Great Zig-Zag" was adopted, bringing the railway down the mountainside on a gradient of 1 in 42. As traffic increased this stretch became a serious handicap, and a costly deviation had to be constructed on which the gradients were kept to a maximum steepness of 1 in 90.

But there are gradients as heavy as those of the zig-zag tackled in the ordinary course, by steam locomotives of the orthodox type. One of the most famous of New South Wales trains is the *"Caves Express"*; in the course of its run from Sydney to Mount Victoria it has to negotiate a 20-mile section of mountain grades of which half is inclined at 1 in 33! The booked speeds on this stretch are about 24 m.p.h. and with normal loads no pilots are taken. Although the locomotives are primarily designed for heavy pulling in the mountains, some quite smart running is made on the easier sections of the line. No very long non-stop runs are made, the 50.9 m.p.h. of the Sydney-Melbourne express over the 30.7 miles from Culcairn to Albury being typical.

Fun With Your Hornby-Dublo Railway

Reproducing the L.N.E.R. Great Central Section

IN previous Hornby-Dublo articles dealing with operations involving the use of the L.N.E.R. Streamlined Express Locomotive and its Coaches, and of the Standard 0–6–2 Tank and Goods Rolling Stock, prominence has almost always been given to the main line practice of the East Coast Route. This is natural, for the "Pacific" giants and other L.N.E.R. items modelled in the Hornby-Dublo range were developed in the first place for East Coast duties. This month, however, we propose to suggest how the standard material can be used in connection with operations on another route of the L.N.E.R.—that of the former Great Central Railway.

Readers may point out that the blue-painted streamliners do not yet work regularly on the G.C. route. This is so, but the ordinary "Pacifics" do, and streamlined engines have made at least one or two appearances. In any case the miniature railway owner is able to please himself, and there is no harm in using a certain amount of imagination and anticipating possible future developments.

The same thing may be applied to the use of the Two-Coach Articulated Unit. The ordinary Corridor Coach D1 can be used to make up trains quite well if the Articulated Unit is not desired, as standard L.N.E.R. stock is in use on all sections of the railway. This stock incorporates all the standard Doncaster features that have been so well reproduced in the Hornby-Dublo Corridor Coach D1. One point about what we may term "Great Central" operations is the fact that passenger train formations are not as a rule heavy; certainly they do not reach the tremendous proportions that are the rule on the East Coast main line. The moderate loads that are usually made necessary by the restricted platform lengths of the average miniature railway system therefore will be quite in order.

So it is not difficult to assemble miniature express trains representing quite well the chief services in and out of Marylebone, London terminus of the Great Central, and now headquarters of the L.N.E.R. As "Pacifics" appear on the longest through workings, the important Manchester trains probably will be the chief services operated by the Hornby-Dublo railway owner who selects the Great Central section as the prototype for his line. The complete journey of 212-odd miles, with intermediate stops at important centres such as Leicester, Nottingham and Sheffield, gives plenty of scope for interesting train running in miniature.

We have frequently dealt with the operations involved in the attachment of goods vans of various kinds or their removal from main line expresses. Apart from the conveyance of odd vans of special traffic in this way it is a frequent practice to convey fish vans by express passenger train on the Great Central section of the L.N.E.R. These vans have come loaded from Grimsby and regularly make their way south at the rear of up expresses. There is therefore every opportunity to make good use of the Hornby-Dublo Fish van, either in the assembly of a fish traffic special, or by running an odd van or two at the rear of an express.

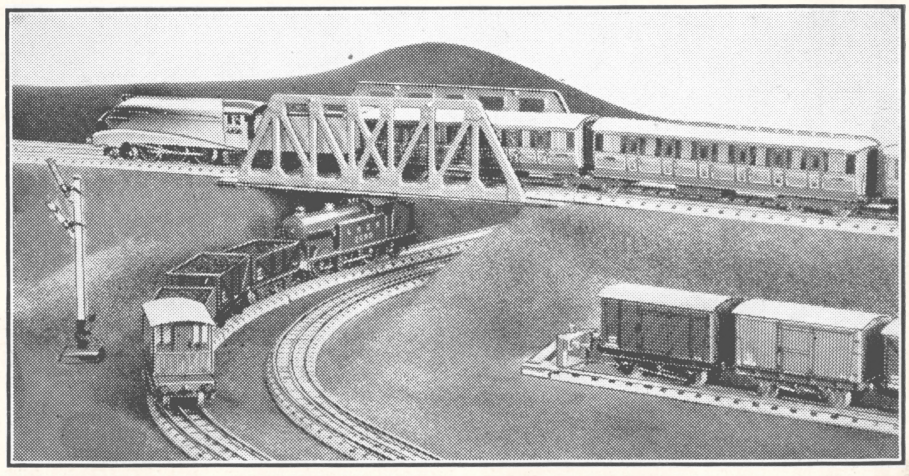
For the haulage of through express goods trains, the use of the Hornby-Dublo "Pacific" will be quite reasonable, for Great Central practice always favoured the use of big engines for such work. This has naturally continued under the L.N.E.R. Local and intermediate goods working call for the Hornby-Dublo Standard 0–6–2 Tank. It can take a hand in running in miniature the numerous coal trains from the South Yorkshire collieries that form such an important part of the Great Central section traffic. For this too the various Dublo Coal Wagons dealt with recently are ideal.

In addition good use can be found for practically all the Hornby-Dublo Rolling Stock for the general traffic. For those who make a special feature of making up miniature loads for their open wagons, the traffic from the heavy industries of Sheffield, for instance, and other important places in Great Central "territory" will give plenty of opportunity for exercising their skill.

Shunting and marshalling operations always have a special appeal. A layout for this purpose can always be arranged, sufficiently extensive for interesting work even if there is not time on any particular occasion to lay down the whole railway. This applies of course to portable railways that have to be put away when finished with; a permanent layout usually includes a shunting yard and this will be practically in full operation during the time that the railway is in use.

The Great Central section has an important yard specially devoted to coal traffic at Wath in Yorkshire. This is a concentrating point for traffic from a wide area, and hump shunting is the method used to sort and marshal the arriving wagons into trains according to the destinations to which they are to be forwarded. Hornby-Dublo Points and Curved Rails, being all of the same radius, are ideal for laying out a miniature "grid-iron" on the lines of the marshalling sidings at Wath. Giant tank locomotives specially designed for the work are employed there; but although the Hornby-Dublo range includes no such monsters as these 0-8-4 Tanks, the Standard Dublo 0-6-2 Tank makes a very efficient substitute.

Apart from operations purely "Great Central", this section has also the interesting feature that it has an alternative route northward from London, owned and worked jointly with the G.W.R. This leaves the Aylesbury route from Marylebone at Neasden, where the Great Central engines stationed in London are housed, and joins up with the G.W.R. at Northolt Junction. The joint line runs via High Wycombe and Princes Risborough, and Great Central metals are rejoined at Grendon Underwood. This route makes it possible to introduce some interesting joint working in miniature whether a choice of routes is available or not. In most cases space will render it impossible to provide a "joint line" of any length, but the presence of Dublo G.W.R. Locomotives and Rolling Stock will add to the variety and interest of operations. Goods trains only will have to represent the G.W.R. partner to the joint line, as the Dublo range does not yet include G.W.R. passenger equipment.



A Hornby-Dublo express on the main line passing over a colliery branch on which a coal train is travelling. This would be a suitable setting on a miniature L.N.E.R. "Great Central" Section as dealt with in this article.

In other respects than that of actual traffic working the Great Central is a very suitable line for modelling. Its London terminus, for instance, is not a big place as London stations go, so that the City Station Outfit can be used very well to build up a miniature "Marylebone." The number of platform faces will not be far short of that in use actually, which is rather different from the usual state of affairs at model terminals!

With regard to other station equipment, the fact that many of the Great Central section stations are built on the island platform principle suggests the use of at least one of the Dublo Island Platforms along the main line.

Hornby-Dublo Signals, which represent the standard type upper quadrant signals now coming into general use, will be suitable for a miniature G.C. line.

Club and Branch News

WITH THE SECRETARY

Looking Forward

We have now reached the holiday month of the year, when indoor activities in Clubs and Branches are least intense. The fine days of the month are being devoted to cycling, rambling and outdoor excursions generally, but it is not too soon to think about the coming winter sessions, and there are certain preparations that should be made now if success is to be assured. Perhaps the most important task is recruiting. New members are essential if a Club is to be successful, and special efforts should be made by all connected with both Clubs and Branches to bring in their friends.

Ideas for the coming session also should be taking shape. It must be borne in mind that most of the recruits will be juniors, and special provision should be made for them. It is too much to expect the average small boy to get the greatest benefit from Club life if he is simply thrown in with a mixed group of boys of all ages and with greater experience than himself. For this reason a Junior Section should be organised, unless of course the Club is a very small one. There is no difficulty in this. An Assistant Leader can be chosen from the Senior members of the Club to take charge of the Section, which could hold its meetings separately from the Senior Section. These meetings should be devoted to model-building, on a scale suitable for the members of the Section, but care should be taken to arrange meetings of a social character, and for train operations and similar pursuits, in which all members of the Club take part. A complete separation of Juniors from Seniors is not advisable.

Enjoyment in fact is the key to success in Club life. For this reason social events should be arranged at regular intervals, and if possible every meeting should include a period for light refreshment.

Mr. R. F. Pierce is Chairman of the Monkstown (County Dublin) Branch, No. 377. This Branch has an excellent layout, equipped with electric lighting, on which timetable operations are carried out regularly. A good Magazine is produced.

Proposed Branches

GUILDFORD—J. C. Cook, 4, Cherrytree Avenue, Bannisters Farm Estate, Guildford.

HEMEL HEMPSTEAD—H. Elms, 14, Manerville Road, Hemel Hempstead; and R. Billington, 32, Chipperfield Road, Hemel Hempstead.

BIRMINGHAM—Mr. D. F. Felton, 17, Bessborough Road, South Yardley, Birmingham 25.

Branches Recently Incorporated

410. DUNBLANE—Mr. J. Williamson, Backcroft Cottage, Dunblane, Perthshire.

411. LONDON—Mr. H. C. Skerratt, 10, Alroy Road, Finsbury Park, London N.4.

412. SHEFFIELD—Mr. G. E. Allsop, 184, Lane End, Chapeltown, Sheffield.

Branch News

Clapham Common.—Special meetings have been devoted to running electric trains over special layouts, the working being strictly to timetable. Mishaps have occasionally occurred, but have been efficiently dealt with by the "linesmen." Informal talks and discussions on operations are held regularly, with interesting results. Fortnightly Talks are given by members. The track is being extended by the addition of Points and more Rails. An excellent magazine is being produced, and a "*Newsletter*" is issued monthly, copies being sent to all members to give them news of Branch events. More members are required and the secretary will be glad to hear from those interested. *Secretary:* K. Maycock, St. Barnabas Vicarage, Lavender Gardens, Clapham Common, London S.W.11.

Barnard Castle School.—Members continue to have good fun with the Branch railway, the layout of which is altered from time to time to allow the introduction of new schemes for operations. A new Tank Locomotive has given special satisfaction in working. An excellent Exhibition was organised for the School Speech Day, at which former members of the Branch were welcomed. *Secretary:* R. Churchill, The School, Barnard Castle.

Dunblane.—This recently incorporated Branch is doing splendid work. A fine layout is being built up. Each section is tested as it is completed and running operations are continually in progress. Special attention is being given to Signals and Points, members being given thorough instruction in their use and in train movements, both in shunting and in running on the main line. Scenery is being painted by members, who are also decorating the Club room, and a Library has been started. *Secretary:* J. Williamson, Backcroft, Dunblane.

Bassets School (Evercreech).—Membership has been affected by the moves that the School has been compelled to make since the outbreak of war, but enthusiasm still prevails and new members are being recruited. Various layouts have been the subject of experimental running, and an excellent track now in use is laid near a stream, the position giving opportunities for introducing interesting bridges and roads, on which Dinky Toys Traffic is heavy. Mr. H. G. Donald, Chairman, has joined the R.A.F., but meetings are being steadily continued and prospects are excellent. *Secretary:* R. C. P. Gulliver, Westcombe House, Evercreech, Somerset.

Selly Oak (Birmingham).—Members are now settling down to regular meetings after the recent disturbances, and all are working hard in getting the Branch room in order and building up the layout. A new Transformer has been installed and the track has been wired for a 2.5v. lighting system. Several outings have been enjoyed by members. *Secretary:* G. O. Jones, 12, Blackthorn Road, Bournville, Birmingham.

Loughton.—Many new members have joined the Branch, and separate meetings for Seniors and Juniors have proved very successful. A new terminus with four platforms and two sidings for locomotives has been constructed and brought into use. For the summer cycling and outdoor games have been included in the programme, and work on the Branch track continues with a view to the resumption of operations when indoor meetings are again held. *Secretary:* G. W. Ruffell, 10, Elmhurst Way, Loughton, Essex.

Club Notes

Plymouth M.C.—In spite of recent raids the Club continues its operations, and has not missed a meeting throughout the war. New premises have been obtained, where there are three rooms for general activities and a special room for games. Senior members are laying down a permanent Hornby Railway with steel track, and the younger members are building a Gantry Crane and various model aeroplanes. A special layout is available for the younger members, who have splendid times in operations on it. The new Club rooms are popular and membership is increasing. Club roll: 90. *Secretary:* M. Allen, 11, Rosedale Avenue, Peverell, Plymouth.

Oakfield School (Newquay) M.C.—Splendid meetings with high average attendances have been held. At one a discussion on aeroplanes was very lively, and at another a Film Display was enjoyed. The Club's successful Exhibition led to requests from many who were unable to attend for a further display, and a still larger Exhibition was arranged. Aeroplanes were the chief models and these gave special delight to visitors. An interesting Lecture on the work of the heavy bombers has been given. Club roll: 18. *Secretary:* T. L. Higgins, Endsleigh Hotel, Bay View Terrace, Newquay, Cornwall.

Acton M.C.—Monthly model-building contests are now arranged. The subjects for April and May were a crane and a warship respectively, and excellent entries were submitted. A specially interesting entry in the second of these contests was a remarkable miniature of an aircraft carrier. A Recruiting Campaign is bringing in many new members. A special feature of the effort is that prospective members are invited to Club meetings, so that they can see for themselves what is done. A Construction Team has been formed for the purpose of speeding up the preparation of the new Club layout, and a varied programme of Model-building Meetings, Games Evenings, Competitions and Lectures is being arranged with a view to the re-opening of the Club Headquarters at the earliest opportunity. Club roll: 29. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Members of the Loughton Branch, No. 360. In recent months the meetings of this Branch have been held three times weekly and enjoyable running is practised on the Branch layout, which is continually being extended and is kept in splendid condition. The services are intensive, and the Branch locomotives stand up magnificently to their hard work.

Islington M.C.—Satisfactory meetings are now being held, and members have been busy recruiting and decorating the new Club room. Three meetings are being held weekly. These are devoted to model-building and the operation of the Club layout, with Fretwork, Stamp Collecting and Aeroplane Modelling as additional attractions. New members are being enrolled, and all are in high spirits. Club roll: 10. *Leader:* Mr. V. Miller, 541, Liverpool Road, London N.7.

York M.C.—At recent meetings special interest has been taken in the Club's Hornby Railway. Members take turns in the positions of Engineer, switchboard controller and points operator, and good running has been enjoyed with an excellent timetable worked out in detail by one of the members. On the model-building side a noteworthy effort is the construction of a Tank Locomotive in which as much detail as possible of the prototype, one of the L.M.S. "2500" class, is being introduced. It is expected that this model will be placed on exhibition when it is completed. One member has constructed a model of an adding machine. Club roll: 7. *Secretary:* G. Hodgson, 1, Sunnyside, Heslington Lane, Fulford, York.

Totnes M.C.—The subjects of recent model-building contests have been "Lorries" and "Cranes." In each interesting models were on show, the first producing a splendid display of differentials, gear goxes, clutches and steering mechanisms. A Table Tennis Tournament has been played and cricket matches are held regularly, members practising assiduously. Valuable assistance was given by members during the Totnes War Weapons Week, of which Mr. P. Harvey, Leader, was organiser. Boxing has been introduced to the programme. Club roll: 18. *Secretary:* T. J. Macnamara, "Gables," Totnes.

Meccano Model-Building Competitions

By "Spanner"

How Would You Complete This Model Crane?

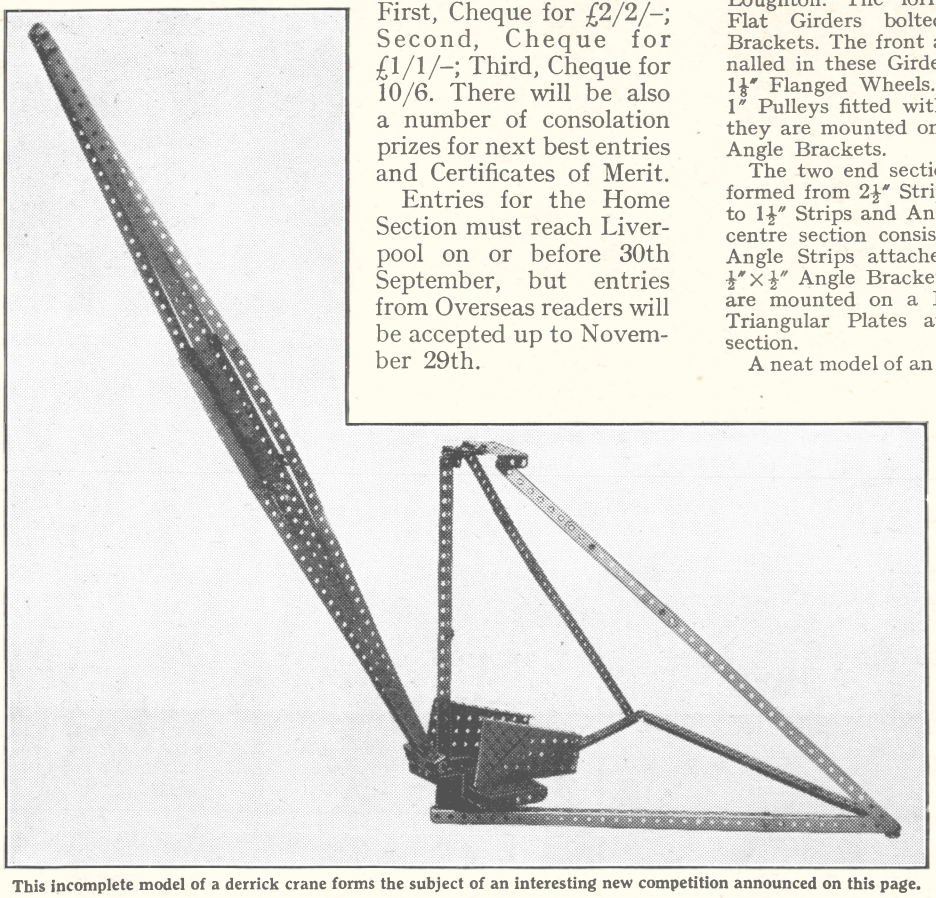
The accompanying illustration shows a model derrick crane that is only partly assembled. There are of course many different ways in which such a model could be completed and few model-builders would find any difficulty in the task provided they had unrestricted choice of Meccano parts. In this contest, however, we are offering prizes to competitors who can complete the model in such a manner that it will lift and lower loads, luff and slew, with the *fewest parts consistent with realism and sturdy construction*. Any Meccano parts may be used.

Competitors should first build up the model exactly as shown in the illustration and then complete it according to their own ideas, using as few parts as possible for this purpose. The model may be driven by a Clockwork or Electric Motor, or if preferred, all the operations may be carried out by hand. Readers should remember that nowadays there are many different kinds of lifting tackle that can be fitted to cranes, and also that there is plenty of scope for originality in the design of the lifting and jib slewing mechanisms.

When the model is finished a photograph or a good drawing of the complete structure should be obtained together with a detailed sketch of the gear-box and operating mechanism. These should be sent to "*Derrick Crane Competition*," Meccano Ltd., Binns Road, Liverpool 13. A list of the additional parts used in completing the model must also be enclosed with the illustrations.

The competition is open to readers of all ages living in the British Isles or Overseas, and the prizes to be awarded are as follows: First, Cheque for £2/2/–; Second, Cheque for £1/1/–; Third, Cheque for 10/6. There will be also a number of consolation prizes for next best entries and Certificates of Merit.

Entries for the Home Section must reach Liverpool on or before 30th September, but entries from Overseas readers will be accepted up to November 29th.



This incomplete model of a derrick crane forms the subject of an interesting new competition announced on this page.

Prize-Winners in the "Simplicity" Competition

The "Simplicity" type of model-building competition is always popular with model-builders and contests of this kind never fail to attract a large number of entries. The main aim in designing models suitable for entry in them is to obtain a realistic appearance using as few Meccano parts as possible. This is a real test of a competitor's knowledge of Meccano parts and their uses, and provides a very interesting pastime. Some of the models submitted in the Contest announced in the February issue of the "*M.M.*" were very skilfully designed, and in some cases their builders had been careful to select original subjects. The full list of prize-winners in the Home Section is as follows:

1st Prize, Cheque for £2/2/–: K. Bray, Loughton; 2nd, Cheque for £1/1/–: J. Thompson, Southampton; 3rd, Cheque for 10/6: J. Darby, Holmfirth.

Postal Orders for 5/–: I. Pearsall, Morecambe; G. Young, Burnley; D. Bradley, Stockton-on-Tees; D. Faulkner, London S.W.1.

The entries included models of tractors, guns, steam engines, aeroplanes and motor cars, and it was a realistic model of a giant lorry and double cranked trailer that won the First Prize for K. Bray, Loughton. The lorry is built up from Flat Girders bolted to ½"×½" Angle Brackets. The front axle is a 2" Rod journalled in these Girders and it carries two 1⅛" Flanged Wheels. The rear wheels are 1" Pulleys fitted with Rubber Rings, and they are mounted on a Rod journalled in Angle Brackets.

The two end sections of the trailer are formed from 2½" Strips bolted at each end to 1½" Strips and Angle Brackets, and the centre section consists of 2½"×½" Double Angle Strips attached to 1½" Strips and ½"×½" Angle Brackets. The trailer wheels are mounted on a Rod journalled in 1" Triangular Plates attached to the rear section.

A neat model of an equatorially mounted reflector telescope was successful in winning Second Prize for J. Thompson, Southampton, The mounting is rigidly constructed from Swivel Bearings bolted to a Crank forming a base. The polar axis is a short Rod gripped in the "spiders" of the Swivel Bearings, and it carries a Collar. This Collar is secured to the telescope and a balance weight.

J. Darby, Holmfirth, who won Third Prize, submitted several little models including a field gun and an anti-aircraft unit. The latter is composed of two models, a searchlight illuminated by a Pea Lamp, and a gun. Both the models can be swivelled and elevated and are mounted on 1¼" Discs, fitted with creeper tracks represented by Couplings. The field gun is constructed from Strips and Angle Brackets and will actually fire Washers or Collars!

D. Faulkner, London S.W.1, was awarded a consolation prize for a model Bren gun carrier, an interesting feature of which is the provision of idler sprockets for the creeper track. These are formed from ½" Pulleys pivotally attached to Flat Brackets and 1½" Strips secured to the chassis.

The superstructure of the model is built up from Strips secured at the front to Double Bent Strips. At the back they are bolted to 1½" Strips attached to the chassis. The imitation Bren gun is mounted in the lower Double Bent Strip, and consists of a 2" Rod, which is attached to a Rod Connector at one end and a Coupling at the other.

Suggestions Section

By "Spanner"

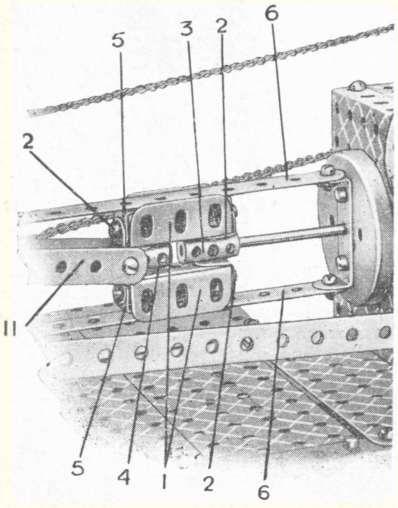


Fig. 515.

(515) Crosshead for Stationary Engine ("Spanner")

Crossheads of the type shown in Fig. 515 are used in large slow-moving engines, in which they are required to withstand great thrusting pressures. The connecting rod 11 is lock-nutted on each side of a Coupling 4 that carries two pairs of 1½" Angle Girders 1. The Bolts securing these Girders also hold in place ½"×½" Angle Brackets, one of which is shown at 2. A second Coupling 3, carrying the piston rod, is fixed to the 1½" Angle Girders and, as with Coupling 4, two Angle Brackets 2 are fitted. Two 1½"×½" Double Angle Strips 5 are bolted between the two sets of ½"×½" Angle Brackets 2.

Each of the slide bars 6 rests on its respective Double Angle Strip and lies between the protruding edges of the 1½" Angle Girders 1. The inner ends of the slide bars are bolted to a 1½"×½" Double Angle Strip secured to a Wheel Flange forming the cylinder head.

(516) Spur Gear Pulley Block

("Spanner")

The pulley block shown in Fig. 516 represents a type of lifting tackle that is used entensively in factories and workshops where it is required to handle goods and materials, which, while not exceptionally heavy, cannot be lifted easily by manual labour alone.

The frame of the pulley block consists of two 2½" Triangular Plates, spaced apart by three 1⅛" Bolts and Nuts. A Hook is secured on the upper 1⅛" Bolt between two Washers and Nuts. Two Flat Brackets also fixed on the upper 1⅛" Bolt provide bearings for a 1½" Rod that carries a ¾" Sprocket and a ½" Pinion 1. The operating Chain 2 device is passed over the ¾" Sprocket. The ½" Pinion 1 meshes with a ¾" Pinion secured on a 1½" Rod 3 that forms a guide for the operating chain, a second guide being provided by another 1½" Rod 4.

The ¾" Pinion on the Rod 3 meshes with a 50-teeth Gear mounted on a 1" Rod. A ¾" Sprocket also fixed on this Rod forms the winding drum for the Chain by means of which the load is raised and lowered. One end of this Chain is bolted to a Large Loaded Hook, and its other end is passed over the Sprocket on the Rod and fastened to a short length of Cord tied to one of the lower 1⅛" Bolts.

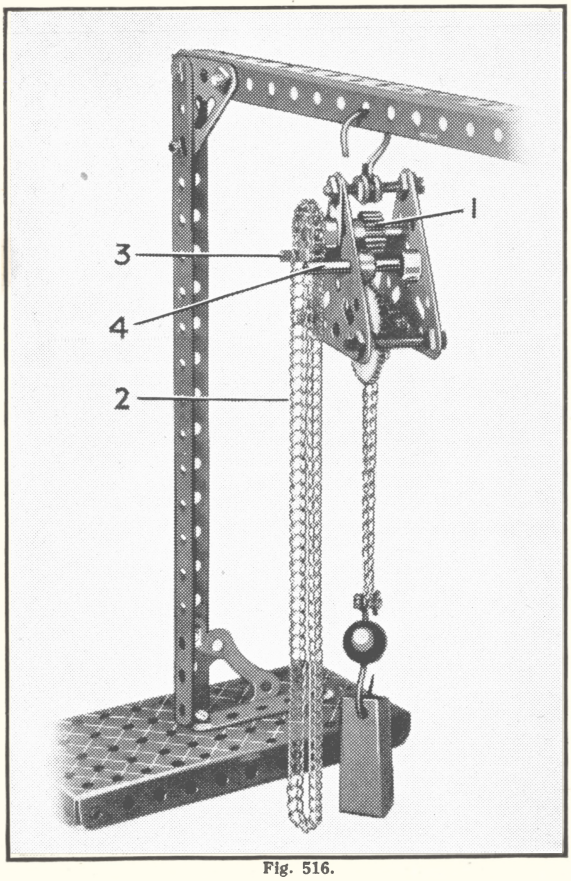


Fig. 516.

(517) Friction Differential

(M. Mason, Hull)

A differential gear is one of the essential mechanisms in a motor car chassis, but unfortunately some model-builders do not possess the necessary gears for assembling the usual type of component. Readers who are in this position will be interested in the gearless device shown in Fig. 517. This works on the friction principle and was designed by M. Mason, Hull.

The differential cage is made up from two 2½"×½" double angle strips, which are built up from Strips and Angle Brackets connected at each end to a Bush Wheel. Two 3" Rods 1 passed through the Bush Wheel, and joined loosely at the middle of the frame by a Coupling, carry two fixed 1" Pulley Wheels, and are held in position by Collars. A 2" Rod 2 holding two ¾" loose Flanged Wheels 3, spaced by Collars and Washers, is passed through the centre

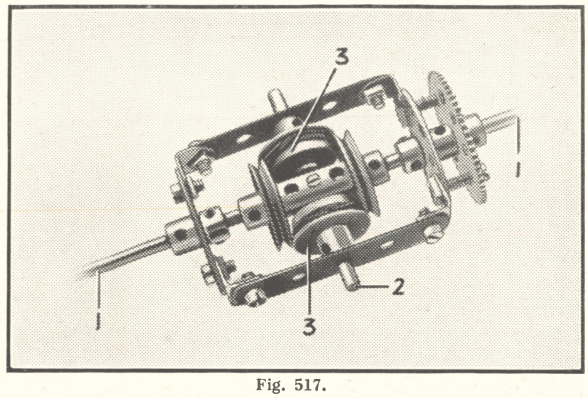


Fig. 517.

holes of the 2½" Strips and then locked in the centre Coupling.

The drive from the propeller shaft is transmitted to the differential cage through a 57-teeth Gear bolted to one of the Bush Wheels.

(518) A Built-Up Eccentric for Large Models (P. Smith, Leamington)

The built-up eccentric shown in Fig. 518 has a stroke of 1 in. It is constructed by bolting a Double Arm Crank to each of two Face Plates, two Washers being placed on each bolt for spacing purposes. A Wheel Flange is secured to one of the Face Plates by three ¾" Bolts, but is spaced from it by two Washers. The second Face Plate is then attached to the ¾" Bolts and spaced from the other Face Plate so that the strap 1 is free to slide between them.

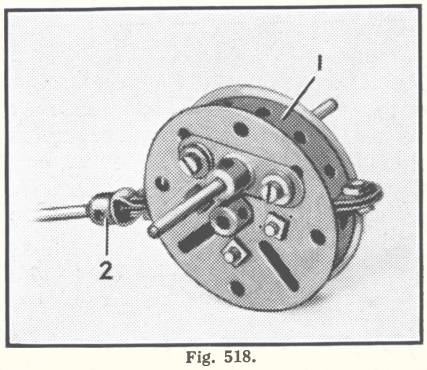


Fig. 518.

The strap consists of two 4½" Strips bent to the shape shown in Fig. 518 and bolted together at their rear ends, a Washer being placed between them for spacing purposes. At the front they are attached to an End Bearing 2, in the boss of which is secured one end of the eccentric rod. The other end of this rod is pivotally attached to the valve rod.

New Meccano Models

Clockwork Tractor and a Cement Mixer

CONSTRUCTION of the model tractor, which is shown in Fig. 1, is begun by securing a No. 2 Clockwork Motor to two 9½″ Angle Girders 1 that form the sides of the chassis, by four Double Bent Strips. These Girders are joined together at their forward ends by two 3″×1½″ Flat Plates overlapped one hole. The steering column is a 6½″ Rod journalled in two left-hand Corner Angle Brackets bolted to one of the Motor sideplates, and it carries at its ends a Steering Wheel and a Worm. The Worm meshes with a ½″ Pinion fixed on a 4½″ Rod 2, bearings for which are provided by two 2½″×1½″ Double Angle Strips bolted to the 3″×1½″ Flat Plates. The Rod 2 also carries two Collars and a ¾″ Pinion that meshes with a 57-teeth Gear 3 pivoted on a ¾″ Bolt. This Bolt is lock-nutted to a Double Bent Strip attached to the 3″×1½″ Flat Plates. A 1½″×½″ Double Angle Strip secured to the Gear 3 provides bearings for a 3″ Rod carrying two 1⅛″ diam. Flanged Wheels and two Collars.

A 1″ Gear fixed on a 1½″ Rod journalled in the Motor sideplates meshes with the main gear of the Motor. A ½″ Pulley also fixed on the 1½″ Rod is connected by a crossed Driving Band to a 2″ Pulley fixed on a 4½″ Rod forming the back axle. This Rod is journalled in the Girders 1.

The front of the body is formed by two Curved Plates overlapped four holes and joined by ½″×½″ Angle Brackets to two Semi-Circular Plates 4. The right-hand side is filled in by a 5½″×2½″ Flexible Plate joined to the chassis by two ½″×½″ Angle Brackets. On the left-hand side two 2½″×2½″ Flexible Plates are used, and between these a gap of ½″ is left to permit winding up of the Motor. The 2½″×2½″ Flexible Plates are bolted to a Hinged Flat Plate by two Obtuse Angle Brackets and also to the 5½″×2½″ Flexible Plate of the right-hand side by two 3″×1½″ Double Angle Strips. A 2½″ Triangular Plate is secured to the Plate by a ½″×½″ Angle Bracket. An Obtuse Angle Bracket forms a rest for the other half of the Hinged Flat Plate.

A seat for the driver is provided by bolting a 3″×1½″ Double Angle Strip to two ½″×½″ Angle Brackets secured to the Angle Girders 1 and two 2½″ Curved Strips 5. A Flat Trunnion is secured to the Double Angle Strip.

Parts required to build model tractor: 1 of No. 6a; 2 of No. 8a; 7 of No. 12; 3 of No. 12c; 1 of No. 14; 2 of No. 15a; 1 of No. 16b; 1 of No. 18a; 2 of No. 19a; 2 of No. 20; 1 of No. 20a; 1 of No. 23a; 1 of No. 25; 1 of No. 26; 1 of No. 27a; 1 of No. 31; 1 of No. 32; 60 of No. 30af; 58 of No. 37bf; 27 of No. 38; 4 of No. 45; 2 of No. 47; 3 of No. 47a; 1 of No. 48; 5 of No. 59; 2 of No. 73; 1 of No. 76; 2 of No. 90; 1 of No. 102; 1 of No. 111; 1 of No. 126a; 1 of No. 147b; 2 of No. 154b; 1 of No. 185; 1 of No. 186a; 1 of No. 188; 2 of No. 190; 1 of No. 192; 1 of No. 198; 2 of No. 200; 2 of No. 214; 1 No. 2 Clockwork Motor.

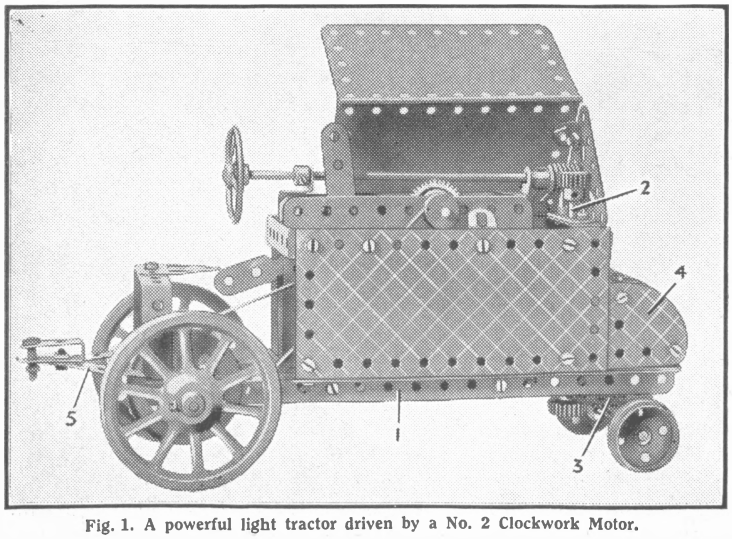


Fig. 1. A powerful light tractor driven by a No. 2 Clockwork Motor.

The model concrete mixer shown in Fig. 2 on this page reproduces the movements of an actual machine of this kind and is driven by a *Magic* Motor. Construction is commenced by building the chassis. The *Magic* Motor 1 is bolted to the underside of a 5½″×2½″ Flanged Plate 2, and the lugs at the rear end of the Motor provide bearings for a 3½″ Rod forming the rear axle. Two 1″ Pulleys fitted with Rubber Rings are mounted on this Rod and are spaced from their bearings by two Spring Clips and three Washers.

The framework in which the mixing drum rotates is built up by securing two 5½″ Strips 3 at the front of the machine, to ½″×½″ Angle Brackets bolted to the Flanged Plate. Two similar Strips 4 at the rear are attached to Flat Brackets also bolted to the Plate 2. These Strips are braced by two further 5½″ Strips 5 that are secured to Trunnions bolted to the chassis, and their upper ends are bolted to Flat Brackets and 2½″ Strips.

The loading pan is a 4½″ Flanged Sector Plate 6, to which two 2½″×1½″ Flexible Plates are bolted. The back is a 2½″×2½″ Flexible Plate bent as shown and attached to the sides by a 2½″ ×½″ Double Angle Strip. The pan is raised and lowered through a 3″ Pulley fixed on one end of a 5″ compound rod, which is journalled in the Flat Brackets bolted to the Strips 3, 4 and 5. A length of Cord is tied at its centre to a Cord Anchoring Spring on the compound rod, and its ends are passed around the rod and fastened to the 2½″ Strips at the back of the pan. The 3″ Pulley is rotated by turning a handwheel formed from a 1¼″ Disc. This Disc, together with a ½″ loose Pulley, is fixed on a ⅜″ Bolt inserted in a Flat Trunnion bolted to one of the Strips 4. The ½″ loose Pulley is connected by a length of Cord to the 3″ Pulley.

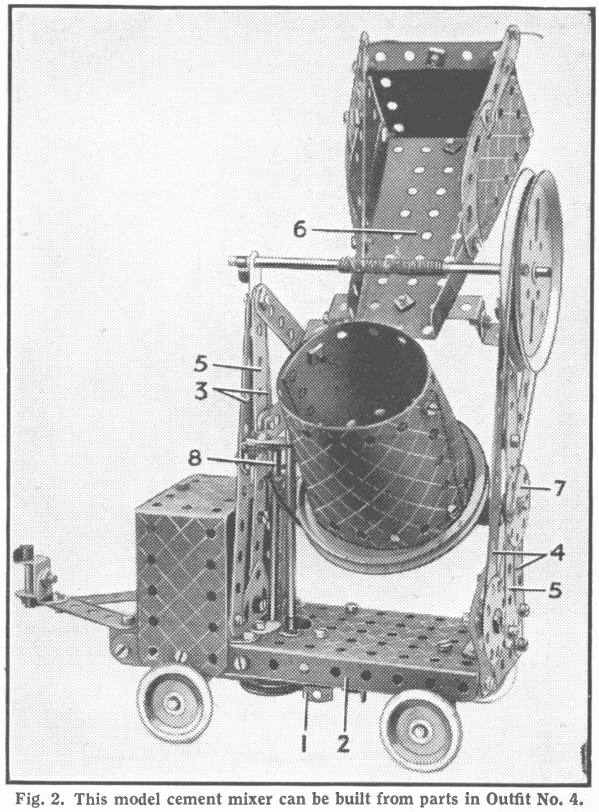


Fig. 2. This model cement mixer can be built from parts in Outfit No. 4.

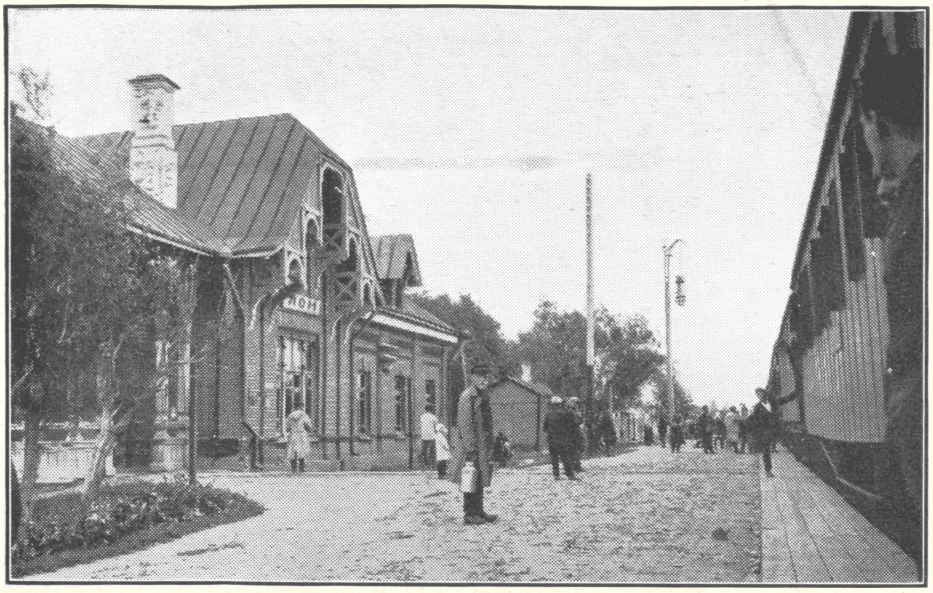
The mixing drum consists of two 4½″×2½″ Flexible Plates bent as shown and attached to a 2½″×½″ Double Angle Strip at their lower ends. At the upper ends they are overlapped one hole and bolted together. The Double Angle Strip is secured to a 3″ Pulley pivoted on a ⅜″ Bolt inserted in the centre hole of a 3½″ Strip. An Angle Bracket at the front end of this Strip is lock-nutted to a 2½″ Strip attached to the Plate 2 by a ½″×½″ Angle Bracket, and another at the back is secured to a ⅜″ Bolt journalled in the rear Strip 5. This ⅜″ Bolt is fixed to the handwheel.

The pulley of the *Magic* Motor is connected by a Driving Band to a 1″ Pulley mounted on a 4″ Rod 8 journalled in the Flanged Plate 2, the 2½″×1½″ Flanged Plate and a ½″×½″ Angle Bracket secured to the front 5½″ Strip 5. A Driving Band passes around the 3″ Pulley of the mixing drum and Rod 8, and also around another 4″ Rod journalled in the Plate 2.

An engine bonnet is formed from 1½″×5½″ Flexible Plates, bent as shown and bolted to the chassis.

When the Motor is set in motion the mixing drum rotates and the loading pan oscillates to and fro to feed the mixture of sand and cement into the drum at a regular rate.

Parts required to build model cement mixer: 6 of No. 2; 2 of No. 3; 8 of No. 5; 5 of No. 10; 1 of No. 11; 8 of No. 12; 2 of No. 15b; 3 of No. 16; 1 of No. 18a; 1 of No. 18b; 2 of No. 19b; 5 of No. 22; 1 of No. 23; 8 of No. 35; 79 of No. 37a; 8 of No. 38; 1 of No. 40; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 1 of No. 54a; 4 of No. 90a; 3 of No. 111c; 2 of No. 125; 2 of No. 126; 1 of No. 126a; 4 of No. 155a; 1 of No. 176; 2 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 191; 1 of No. 213; 2 of No. 217a. 1 *Magic* Motor and two 6″ Driving Bands included with it.



A typical railway station in the heart of Russia.

had to be scrapped and started anew. But such mistakes were only to be expected in such a gigantic programme and with the scanty material available.

It was my privilege to visit Russia in 1930 when I spent a month travelling about the country, and again in 1935. In the latter year I found the great motor works at Sormovo turning out over 40,000 motor cars a year, but the plant is so designed that it is to have a total output of 140,000 cars a year which will equal, if not eclipse, the great Ford works at Detroit. Sormovo is a new suburb of the ancient city of Nijni-Novgorod, now called Gorky. As I stood overlooking the toothed walls of its ancient Kremlin, my eyes wandered across an almost interminable forest of factory chimneys away to the north of Sormovo, along the right bank of the historic Volga. Here are the great shipbuilding yards, steel and iron foundries, saw-mills, machine and tool shops, employing at the time of my visit some 50,000 workers, and upon which over a million roubles had been spent.

Take a steamer from here down the Volga and step off at Kharkov, Stalingrad and other points in the Ukraine, and you are amazed at the activity going on. Sleepy old Kharkov has been turned into a hive of industry. Here is a great plant already turning out about 30,000 tractors a year, and being equipped for an annual output of 50,000. It is right in the heart of a rich agricultural country, and here we find the collective farms which are doing much to make work on the land attractive and less laborious and monotonous. To-day your Russian farmer toils but eight hours, and has social recreations in the form of workers' clubs, houses of culture, cinemas and special entertainments.

Stalingrad stands for heavy industries—coal, iron and steel. It is an amazing place, consisting of four independent towns, scrupulously kept, separated by the green banks of the Volga. One town works the timber from the adjacent forests; another the minerals and ores from the Urals; another converts the coal of the district into electrical energy for general distribution, and so on. Russia recognises the value of cheap power, and in addition to the enlargement of existing power stations, between thirty and forty new plants have been erected. In some cases electrical energy is being obtained from coal, in others by harnessing the falls and rapids in the rivers. By far the largest of the latter is the power plant on the Dnieper, in South Russia, where monster turbines generate 400,000 horsepower.

To what extent Russia has been industrialised may be gauged when it is stated that in 1913 the output of coal from the Russian mines was 28,900,000 tons. By 1930 it had grown to 45,700,000 tons; the figures for 1936, the latest available, being 126,200,000 tons. The output of oil before 1914 was 9,000,000 tons a year; to-day it is over 30,000,000 tons. In 1913 Russia produced 4,000,000 tons of steel. To-day she has several single steel plants capable of an annual output of over a million tons apiece. Her largest steel works has an annual output of 2,500,000 tons. No wonder the Nazis cast covetous eyes upon industrial Russia!

I found the Russian worker happy and contented, assured of at least a small competence, and encouraged in his efforts by ingenious propaganda. Every factory has its Lenin's Corner, or Soviet, a committee appointed by the workers, who meet regularly to discuss conditions and make suggestions for greater efficiency. Every factory, too, has its wall newspaper, to which all are free to contribute; while in the grounds is a striking array of pictures, beginning with an aeroplane, followed by a locomotive, a steamboat, an athlete running, and so on, down to the slow-moving lobster and snail. The aeroplane represents one hundred per cent., and it is the aim of each department in the factory to reach that standard. At regular intervals the picture "earned" is allotted to the various departments by a well planned system of marks and voting.

A church in Nijni-Novgorod that is said to possess the oldest and most prized ikons in Russia.

A Railway Accident of 80 Years Ago

The Clayton Tunnel Disaster

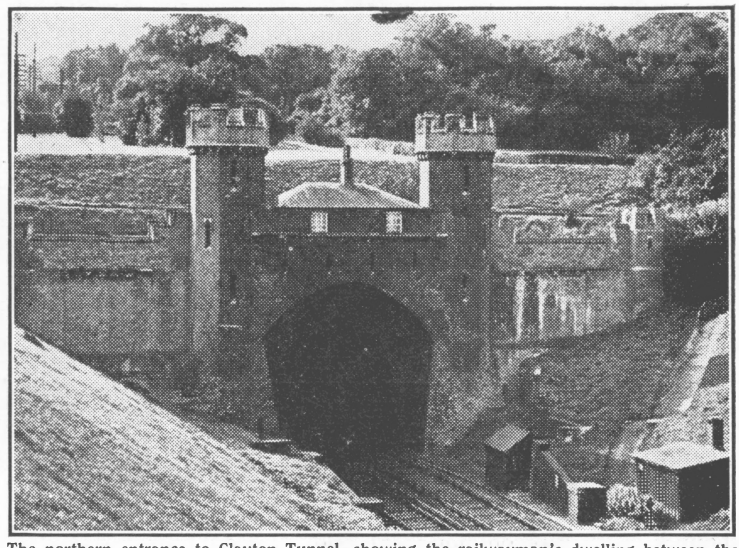
REGULAR travellers between London and Brighton will probably be familiar with the fortress-like entrance to Clayton Tunnel, the last tunnel but one encountered before the "Southern Electric" glides smoothly into Brighton Central. Apart from the interest that is attached to tunnel mouths with more or less ornamental entrances, most Hornby railway owners will agree that few better situations for "watching the trains" could be found than the railwayman's dwelling that is built between the towers of the north entrance to the tunnel, shown in the upper illustration on this page.

It is close upon a century since the line was opened through to Brighton, 21st September 1841 being the actual date. This month of August however it is just 0 years since a grievous event connected with the tunnel took place; for on 25th August 1861 occurred the Clayton Tunnel disaster, now almost forgotten but for long a byword among travellers and railwaymen alike. The one redeeming feature of this accident was that it led to the improvement of operating methods and to greater efficiency in signalling and train control.

Clayton Tunnel, or rather the southern end of it, is situated at the third of the summit points between Clapham Junction and Brighton, to which the approaches in either direction are graded at 1 in 264. Each of these summits actually is crowned with a tunnel through the hills that make each climb necessary. The ventilating shaft of Clayton Tunnel rears up on the top of its hill and is a prominent feature of the landscape. The length of the tunnel itself is 2,288 yards.

On Sunday, 25th August 1861, two up excursion trains were due to leave Brighton before a regular stopping passenger train. The first train had come from Portsmouth and was travelling via Brighton; the other two were starting from there. In those days trains were worked on the "time-interval" system, each being despatched from a station at a given time after the departure of the previous one. In this case the time interval between the first and second trains was supposed to be ten minutes, and between the second and third a quarter of an hour. Actually each left late, and in each case there was only an interval of four minutes between successive trains.

The southern approach to the tunnel was then guarded by a distant signal some 300 yards or so from the signal cabin immediately before the tunnel mouth. This signal could be put to show "Caution" by means of a treadle operated by the wheel flanges of passing trains, but had to be placed in the "line clear" position by the signalman. There was telegraphic communication between the cabins at each end of the tunnel, so that the passing of trains out of the tunnel could be reported by one signalman to his "opposite number" who signalled them in at the other end.



The northern entrance to Clayton Tunnel, showing the railwayman's dwelling between the turrets incorporated in the design of the tunnel end. Photograph by A. H. Owens, London N.W.2.

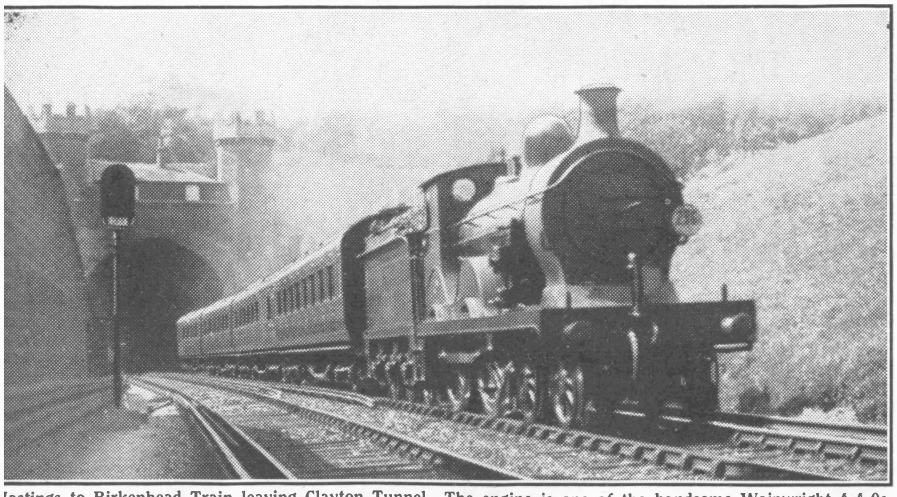
Unfortunately the first of the excursion trains did not operate the treadle, so that the distant signal remained in the "line clear" position after it had passed; and for some reason the signalman could not set it to "Caution." Thus when the second train came along it proceeded as usual until, on the point of passing into the tunnel, the driver was "flagged" by the signalman, but not expecting a danger indication was unable to stop before running a good way inside.

Having come to a stand in the tunnel this train should have stayed where it was according to the company's rules, and the rear guard should then have gone back to the signal cabin to see what was wrong. Apparently however the driver commenced to back his train, although the rear guard kept his brake hard on in order to prevent this if possible.

In the meantime the south end signalman, having seen the train over-run his "danger" flag signal and disappear into the tunnel, telegraphed to the north end to enquire whether the train had emerged at that end. An affirmative reply was received, the signalman there evidently thinking that the Portsmouth train was referred to. While the Brighton excursion was still in the tunnel therefore the ordinary stopping train approached and was given a clear road into the tunnel, the signalman thinking that its way was clear.

Into the tunnel then ran the stopping train, its engine getting the benefit of the descent commencing there; and all too late, owing to smoke and steam from previous trains, the driver caught sight of the tail lights of the excursion. In spite of all his efforts his engine crashed into the train in front, knocking it forward and ploughing through its rear vehicles for 35 yards before coming to rest with its front buffer beam up in the air. The casualty list was heavy, 23 people being killed and 175 injured, while the wreckage made the tunnel impassable. It was in fact the worst railway disaster up to that time.

At the enquiry the Board of Trade Inspector recommended the maintenance of an interval of space rather than time between trains, and also the adoption of a system of braking whereby "one man can brake all the wheels at once . . ." These recommendations eventually were carried out, and have been a feature of British railway practice for many years past.



Hastings to Birkenhead Train leaving Clayton Tunnel. The engine is one of the handsome Wainwright 4-4-0s of the former S.E.C.R. Prize-winning photograph by H. S. G. Darke, London N.W.11.

The Transformation of Russia

A Great Industrial Development

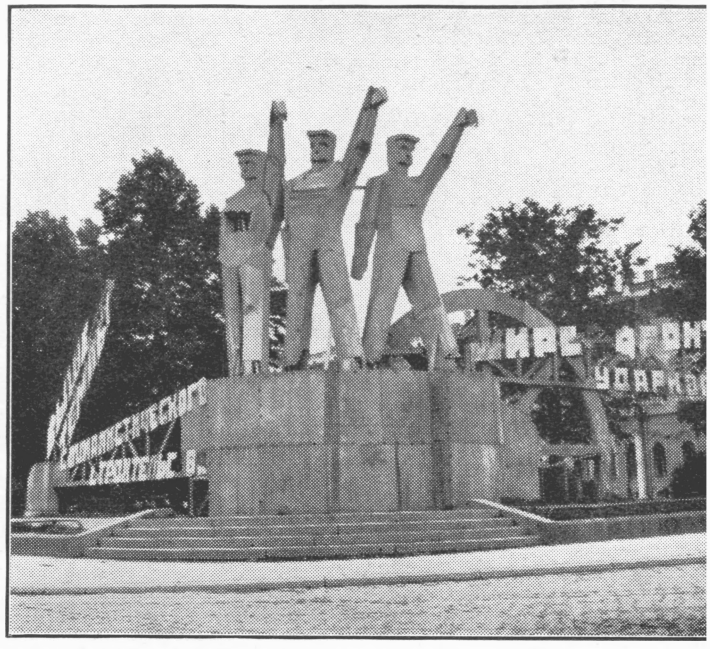
By Harold J. Shepstone, F.R.G.S.

BEFORE one tries to form an adequate impression of Russia it is necessary to realise clearly that she is no ordinary country, and that she cannot be judged by ordinary standards. She stands on a different plane from any other land. To begin with, there is her immensity, over 8,000,000 square miles in extent, with a population of some 165,000,000, representing many different races. Some four-fifths of this immense area lies in Asia, the remaining fifth in Europe, the European population alone being over a hundred million. She stretches from the Baltic in Europe to Vladivostock on the Pacific, a distance of some 6,000 miles; northward to the Polar regions and southward to the Caucasus Mountains and the borders of Iran and Afghanistan. Her form of government is a republic, known as the Union of Soviet Republics, all bound together in common ideals and obeying the central control of Moscow and the All-Russian Congress of Soviets, which is representative of all its units and nations.

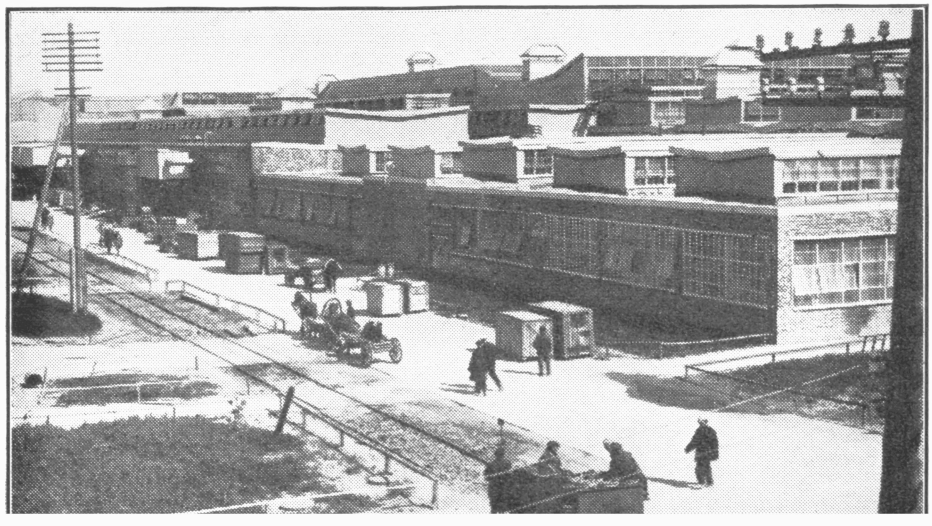
The marvel of Russia is her attempt, in which she has at least partially succeeded, to jump at a single bound from a purely agricultural country, and a backward one at that, into a great industrial state. She planned to accomplish in a few years what had taken other industrial nations many centuries. Seventy per cent. of her people were illiterate; technical knowledge was lacking. No engineering experts, scientists and chemists were available among her own people for such a colossal task, their services had to be engaged from outside. To imagine that such a backward nation could be converted in a few years into a highly efficient industrial state was regarded at the time as an impossible feat. But Russia, undaunted, went ahead and accomplished her ambition by the resort to what she termed five-year plans.

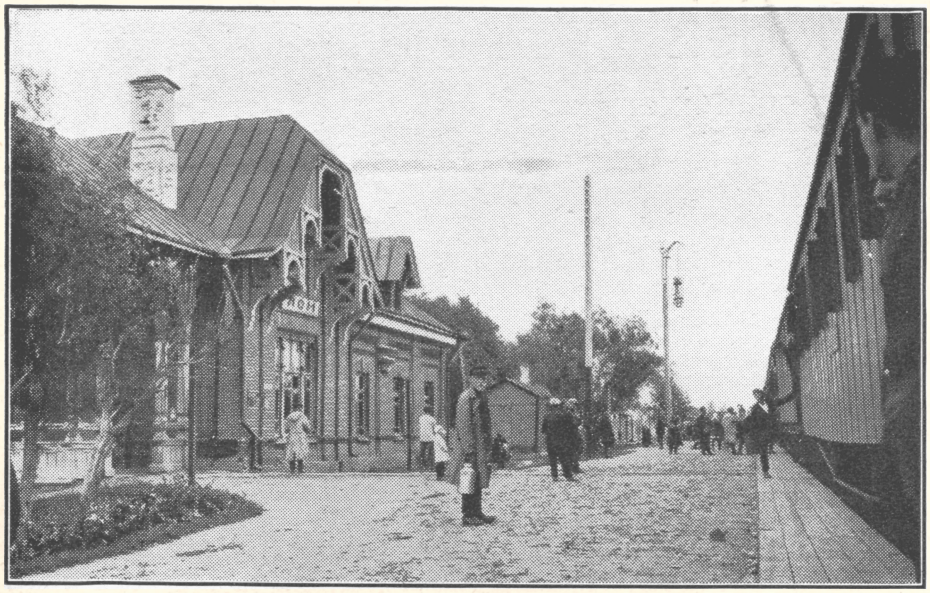
There have been two of these plans, the first between the years 1928-33, and the second between the yea 1933-38. There was to have been third, but the unsettled conditions Europe held it up. In those two fiv year plans certain work was schedul to be completed within these perio In both cases the work planned w finished within four years, a ye ahead of schedule, which spea volumes for the enthusiasm wi which the whole nation accept their government's proposals a carried them out.

In the first five-year plan ov 1,000 new factories were built, a over two-thirds of them were runni complete with plant and machine at the end of the fourth year. The factories have not been erect haphazard at isolated spots; they c the landscape all the way fr Leningrad in the north to the Caspi Sea in the south, and eastward rig away into Siberia. The plan cal for the erection of many entirely n towns, for the more important f tories are located at strategic poin near to available raw material, close to rail or river, to ensure ra



"The Shock Brigade." This somewhat strange wooden creation marks one of approaches to Winter Palace Square, Leningrad. All Russian factories boast of t shock brigades, bands of expert workers whose mission it is to set an example efficiency to their fellow toilers.





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A church in Nijni-Novgorod that is said to possess the oldest and m prized ikons in Russia.

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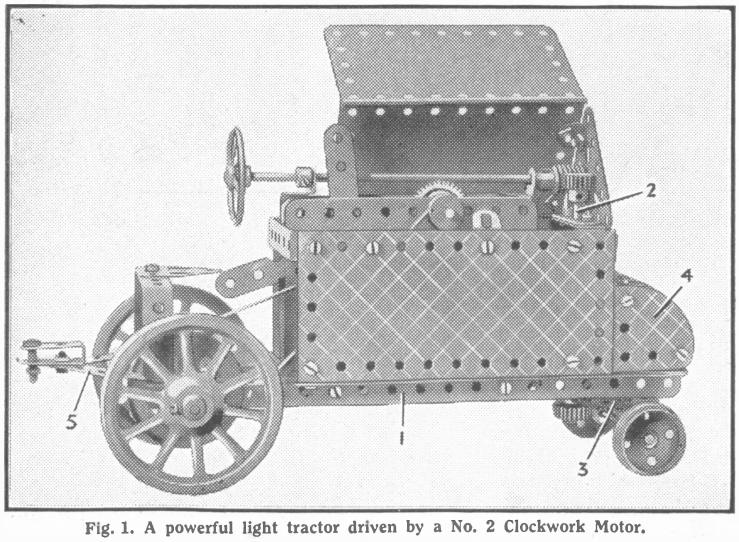


Fig. 1. A powerful light tractor driven by a No. 2 Clockwork Motor.

The model concrete mixer shown in Fig. 2 on this page reproduces the movements of an actual machine of this kind and is driven by a *Magic* Motor. Construction is commenced by building the chassis. The *Magic* Motor 1 is bolted to the underside of a 5½″×2½″ Flanged Plate 2, and the lugs at the rear end of the Motor provide bearings for a 3½″ Rod forming the rear axle. Two 1″ Pulleys fitted with Rubber Rings are mounted on this Rod and are spaced from their bearings by two Spring Clips and three Washers.

The framework in which the mixing drum rotates is built up by securing two 5½″ Strips 3 at the front of the machine, to ½″×½″ Angle Brackets bolted to the Flanged Plate. Two similar Strips 4 at the rear are attached to Flat Brackets also bolted to the Plate 2. These Strips are braced by two further 5½″ Strips 5 that are secured to Trunnions bolted to the chassis, and their upper ends are bolted to Flat Brackets and 2½″ Strips.

The loading pan is a 4½″ Flanged Sector Plate 6, to which two 2½″×1½″ Flexible Plates are bolted. The back is a 2½″×2½″ Flexible Plate bent as shown and attached to the sides by a 2½″×½″ Double Angle Strip. The pan is raised and lowered through a 3″ Pulley fixed on one end of a 5″ compound rod, which is journalled in the Flat Brackets bolted to the Strips 3, 4 and 5. A length of Cord is tied at its centre to a Cord Anchoring Spring on the compound rod, and its ends are passed around the rod and fastened to the 2½″ Strips at the back of the pan. The 3″ Pulley is rotated by turning a handwheel formed from a 1¼″ Disc. This Disc, together with a ½″ loose Pulley, is fixed on a ⅜″ Bolt inserted in a Flat Trunnion bolted to one of the Strips 4. The ½″ loose Pulley is connected by a length of Cord to the 3″ Pulley.

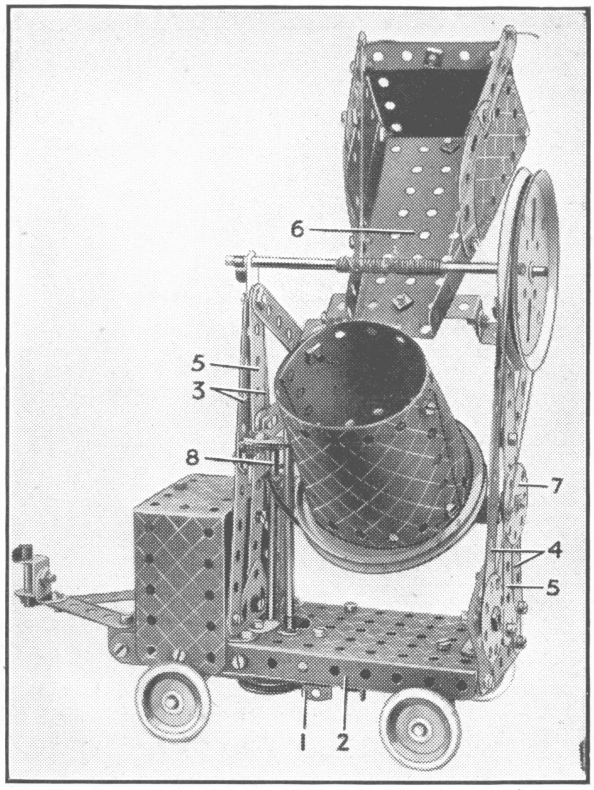


Fig. 2. This model cement mixer can be built from parts in Outfit No. 4.

The mixing drum consists of two 4½″×2½″ Flexible Plates bent as shown and attached to a 2½″×½″ Double Angle Strip at their lower ends. At the upper ends they are overlapped one hole and bolted together. The Double Angle Strip is secured to a 3″ Pulley pivoted on a ⅜″ Bolt inserted in the centre hole of a 3½″ Strip. An Angle Bracket at the front end of this Strip is lock-nutted to a 2½″ Strip attached to the Plate 2 by a ½″×½″ Angle Bracket, and another at the back is secured to a ⅜″ Bolt journalled in the rear Strip 5. This ⅜″ Bolt is fixed to the handwheel.

The pulley of the *Magic* Motor is connected by a Driving Band to a 1″ Pulley mounted on a 4″ Rod 8 journalled in the Flanged Plate 2, the 2½″×1½″ Flanged Plate and a ½″×½″ Angle Bracket secured to the front 5½″ Strip 5. A Driving Band passes around the 3″ Pulley of the mixing drum and Rod 8, and also around another 4″ Rod journalled in the Plate 2.

An engine bonnet is formed from 1½″×5½″ Flexible Plates, bent as shown and bolted to the chassis.

When the Motor is set in motion the mixing drum rotates and the loading pan oscillates to and fro to feed the mixture of sand and cement into the drum at a regular rate.

Parts required to build model cement mixer: 6 of No. 2; 2 of No. 3; 8 of No. 5; 5 of No. 10; 1 of No. 11; 8 of No. 12; 2 of No. 15b; 3 of No. 16; 1 of No. 18a; 1 of No. 18b; 2 of No. 19b; 5 of No. 22; 1 of No. 23; 8 of No. 35; 79 of No. 37a; 8 of No. 38; 1 of No. 40; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 1 of No. 54a; 4 of No. 90a; 3 of No. 111c; 2 of No. 125; 2 of No. 126; 1 of No. 126a; 4 of No. 155a; 1 of No. 176; 2 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 191; 1 of No. 213; 2 of No. 217a. 1 *Magic* Motor and two 6″ Driving Bands included with it.

The Transformation of Russia

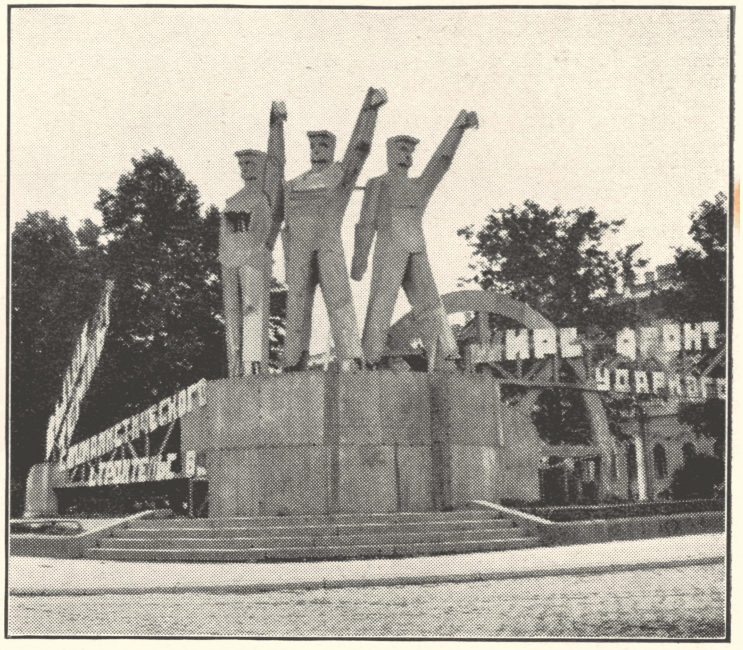
A Great Industrial Development

By Harold J. Shepstone, F.R.G.S.

BEFORE one tries to form an adequate impression of Russia it is necessary to realise clearly that she is no ordinary country, and that she cannot be judged by ordinary standards. She stands on a different plane from any other land. To begin with, there is her immensity, over 8,000,000 square miles in extent, with a population of some 165,000,000, representing many different races. Some four-fifths of this immense area lies in Asia, the remaining fifth in Europe, the European population alone being over a hundred million. She stretches from the Baltic in Europe to Vladivostock on the Pacific, a distance of some 6,000 miles; northward to the Polar regions and southward to the Caucasus Mountains and the borders of Iran and Afghanistan. Her form of government is a republic, known as the Union of Soviet Republics, all bound together in common ideals and obeying the central control of Moscow and the All-Russian Congress of Soviets, which is representative of all its units and nations.

The marvel of Russia is her attempt, in which she has at least partially succeeded, to jump at a single bound from a purely agricultural country, and a backward one at that, into a great industrial state. She planned to accomplish in a few years what had taken other industrial nations many centuries. Seventy per cent. of her people were illiterate; technical knowledge was lacking. No engineering experts, scientists and chemists were available among her own people for such a colossal task, their services had to be engaged from outside. To imagine that such a backward nation could be converted in a few years into a highly efficient industrial state was regarded at the time as an impossible feat. But Russia, undaunted, went ahead and accomplished her ambition by the resort to what she termed five-year plans.

There have been two of these plans, the first between the years 1928-33, and the second between the years 1933-38. There was to have been a third, but the unsettled conditions in Europe held it up. In those two five-year plans certain work was scheduled to be completed within these periods. In both cases the work planned was finished within four years, a year ahead of schedule, which speaks volumes for the enthusiasm with which the whole nation accepted their government's proposals and carried them out.



"The Shock Brigade." This somewhat strange wooden creation marks one of the approaches to Winter Palace Square, Leningrad. All Russian factories boast of their shock brigades, bands of expert workers whose mission it is to set an example in efficiency to their fellow toilers.

The tractor works at Kharkov, in the Ukraine, are destined to have an output of 50,000 machines a year.

In the first five-year plan over 1,000 new factories were built, and over two-thirds of them were running complete with plant and machinery at the end of the fourth year. These factories have not been erected haphazard at isolated spots; they dot the landscape all the way from Leningrad in the north to the Caspian Sea in the south, and eastward right away into Siberia. The plan called for the erection of many entirely new towns, for the more important factories are located at strategic points, near to available raw material, or close to rail or river, to ensure rapid transit to all parts of the Union. True, there were mistakes. Partially erected plants and important works

A Railway Accident of 80 Years Ago

The Clayton Tunnel Disaster

REGULAR travellers between London and Brighton will probably be familiar with the fortress-like entrance to Clayton Tunnel, the last tunnel but one encountered before the "Southern Electric" glides smoothly into Brighton Central. Apart from the interest that is attached to tunnel mouths with more or less ornamental entrances, most Hornby railway owners will agree that few better situations for "watching the trains" could be found than the railwayman's dwelling that is built between the towers of the north entrance to the tunnel, shown in the upper illustration on this page.

It is close upon a century since the line was opened through to Brighton, 21st September 1841 being the actual date. This month of August however it is just 80 years since a grievous event connected with the tunnel took place; for on 25th August 1861 occurred the Clayton Tunnel disaster, now almost forgotten but for long a byword among travellers and railwaymen alike. The one redeeming feature of this accident was that it led to the improvement of operating methods and to greater efficiency in signalling and train control.

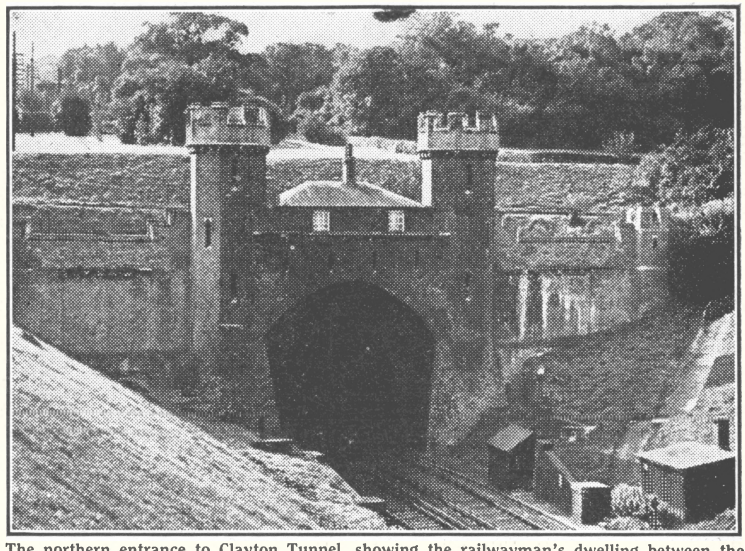
Clayton Tunnel, or rather the southern end of it, is situated at the third of the summit points between Clapham Junction and Brighton, to which the approaches in either direction are graded at 1 in 264. Each of these summits actually is crowned with a tunnel through the hills that make each climb necessary. The ventilating shaft of Clayton Tunnel rears up on the top of its hill and is a prominent feature of the landscape. The length of the tunnel itself is 2,288 yards.

On Sunday, 25th August 1861, two up excursion trains were due to leave Brighton before a regular stopping passenger train. The first train had come from Portsmouth and was travelling via Brighton; the other two were starting from there. In those days trains were worked on the "time-interval" system, each being despatched from a station at a given time after the departure of the previous one. In this case the time interval between the first and second trains was supposed to be ten minutes, and between the second and third a quarter of an hour. Actually each left late, and in each case there was only an interval of four minutes between successive trains.

The southern approach to the tunnel was then guarded by a distant signal some 300 yards or so from the signal cabin immediately before the tunnel mouth. This signal could be put to show "Caution" by means of a treadle operated by the wheel flanges of passing trains, but had to be placed in the "line clear" position by the signalman. There was telegraphic communication between the cabins at each end of the tunnel, so that the passing of trains out of the tunnel could be reported by one signalman to his "opposite number" who signalled them in at the other end.

Unfortunately the first of the excursion trains did not operate the treadle, so that the distant signal remained in the "line clear" position after it had passed; and for some reason the signalman could not set it to "Caution." Thus when the second train came along it proceeded as usual until, on the point of passing into the tunnel, the driver was "flagged" by the signalman, but not expecting a danger indication was unable to stop before running a good way inside.

Having come to a stand in the tunnel this train should have stayed where it was according to the company's rules, and the rear guard should then have gone back to the signal cabin to see what was wrong. Apparently however the driver commenced to back his train, although the rear guard kept his brake hard on in order to prevent this if possible.

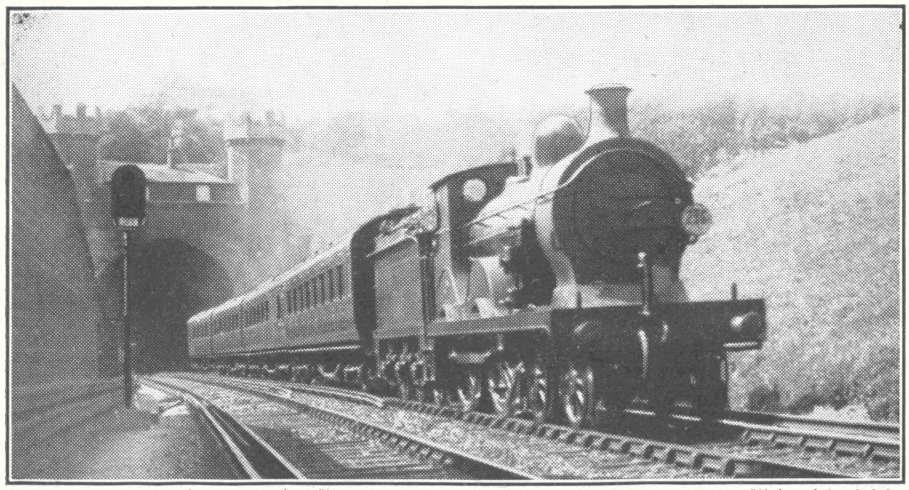


The northern entrance to Clayton Tunnel, showing the railwayman's dwelling between the turrets incorporated in the design of the tunnel end. Photograph by A. H. Owens, London N.W.2.

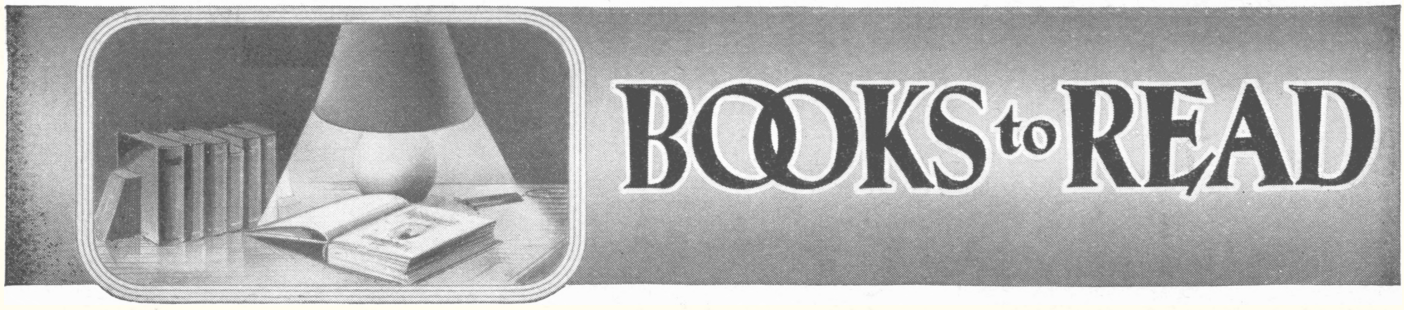
In the meantime the south end signalman, having seen the train over-run his "danger" flag signal and disappear into the tunnel, telegraphed to the north end to enquire whether the train had emerged at that end. An affirmative reply was received, the signalman there evidently thinking that the Portsmouth train was referred to. While the Brighton excursion was still in the tunnel therefore the ordinary stopping train approached and was given a clear road into the tunnel, the signalman thinking that its way was clear.

Into the tunnel then ran the stopping train, its engine getting the benefit of the descent commencing there; and all too late, owing to smoke and steam from previous trains, the driver caught sight of the tail lights of the excursion. In spite of all his efforts his engine crashed into the train in front, knocking it forward and ploughing through its rear vehicles for 35 yards before coming to rest with its front buffer beam up in the air. The casualty list was heavy, 23 people being killed and 175 injured, while the wreckage made the tunnel impassable. It was in fact the worst railway disaster up to that time.

At the enquiry the Board of Trade Inspector recommended the maintenance of an interval of space rather than time between trains, and also the adoption of a system of braking whereby "one man can brake all the wheels at once . . ." These recommendations eventually were carried out, and have been a feature of British railway practice for many years past.



Hastings to Birkenhead Train leaving Clayton Tunnel. The engine is one of the handsome Wainwright 4-4-0s of the former S.E.C.R. Prize-winning photograph by H. S. G. Darke, London N.W.11.



Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Engines of War"
(A. & C. Black. 7/6 net)

Here for the first time we have a vivid picture, complete as far as national security allows, of our own new mechanised army. It has been prepared with the full co-operation of the War Office, and contains a foreword by General Sir John Dill, Chief of the Imperial General Staff. The text is accompanied by a wealth of splendid illustrations, many of them from official photographs, and altogether the book is an excellent production that will bring home to us what is involved in modern war on land. A royalty on every copy sold is given to the Soldiers', Sailors' and Airmen's Families Association.

Every phase of modern mechanised warfare is covered in the book. We see how light and heavy tanks cross rough, muddy or otherwise difficult country and go into action; we work with the men behind the guns of the Royal Artillery and of the Anti-Aircraft Defence Units, and accompany the Royal Engineers in their bridge building and other constructive work. Then we turn to the infantry, and finally deal with Signals and the tasks of the various Corps that supply the Army with all it needs, from food to ammunition, and with the training of recruits.

"Action Stations"
By Rear-Admiral H. G. Thursfield
(A. & C. Black. 7/6 net)

"Action Stations" tells us the full story of the Navy of to-day in words and pictures. The author is an expert who understands every detail of the immense and carefully planned Naval Forces of the Empire, and in particular is aware of the importance of the little ships in modern war at sea. With this in mind he begins his story with the work of the destroyers, on which falls the duty of protecting convoys, and of the trawlers, corvettes and other little ships that are playing such a magnificent part in the relentless fight against the U-boats.

Next come cruisers and battleships, the big ships that take the brunt of the heavy fighting that at times becomes necessary. Striking pictures of the work of these giants, especially in the Mediterranean, help us to realise their value and to understand the need for them. Explanations of the running of a submarine and of the manner in which the Fleet Air Arm does its job complete a very striking survey.

The 75 fine photographs that illustrate the story have been selected carefully, most of them from official sources.

"The Discovery of Man"
By Stanley Casson
(The Scientific Book Club. 2/6 net)

For some time now we have been digging and delving to find the arms, tools, utensils and even the homes of our remote ancestors, and through these remains to learn how Man has gained his mastery over the Earth. How this has been done is here finely told by Mr. Casson, and older readers of the "*M.M.*" will acquire from his book a real knowledge of their own race and its wonderful history.

The tale begins more than 2,000 years ago, with facts and legends handed down to us by Greek writers and travellers. The interest grows when we read how a Catholic priest named Father MacEnery explored Kent's cavern, near Torquay, a little more than a century ago and found the tooth of a rhinoceros along with a flint weapon, the first indication of the immense age of the human race.

Other discoveries quickly followed. The story of these is written round the men who made them so that we can picture them at work. One of the greatest was Schliemann, a grocer, and a very successful one, who used a fortune made in business in digging out the remains of ancient Troy. To the world's amazement he discovered in successive layers the remains of three historic cities, one of which was that of the famous siege, and, beneath them, those of six prehistoric cities of the Bronze Age. Schliemann followed this up by other wonderful discoveries in Greece itself.

The discovery of famous fossil skulls and other relics of ancient Man, and what these have taught us about our own ancestors, also find a place in the book, which will set its readers looking for more about the topics on which Mr. Casson writes. There are eight full page plates.

Owing to difficulties that have arisen as the result of war conditions it is impossible to guarantee the immediate delivery of books ordered in accordance with the scheme explained at the head of the first column on this page. For this reason readers who order books must be prepared for some delay, but every effort will be made to ensure speedy despatch.

"A.A.S.F."
By Charles Gardner (Hutchinson. 7/6 net)

On 1st September 1939 squadrons of British bombers flew across the Channel and landed in France. They were the advance guard of the Advanced Air Striking Force, which for over nine months remained our front line of the air and fought a tremendous battle against terrific odds when the "blitzkrieg" began on the Western Front. Mr. Gardner, the author of this book, accompanied the A.A.S.F. as the B.B.C. war correspondent, and here is his story of its nine months' activity.

As correspondent of the B.B.C. Mr. Gardner will be well known to readers, most of whom will have heard his striking despatches from the Front, including at least one in which the roar of exploding bombs punctuated his story. There is the same realism in his book. In part this is reproduced from his diary, thus giving direct impressions of the scenes he witnessed; and now he is able to reveal names and details that previously had to be kept secret. The result is a story of adventure and heroism that can scarcely be surpassed. Page after page is packed with accounts of terrific combats and daring deeds. We read of the exploits of such men as Cobber Kain and Orton, of the fighter squadrons, and of Pilot Officer Davey and his comrades of the 12th Squadron who went out to bomb the Maastricht bridges, which had not been demolished. Of six crews chosen for the Maastricht exploit there were only two survivors—but the bridges were broken.

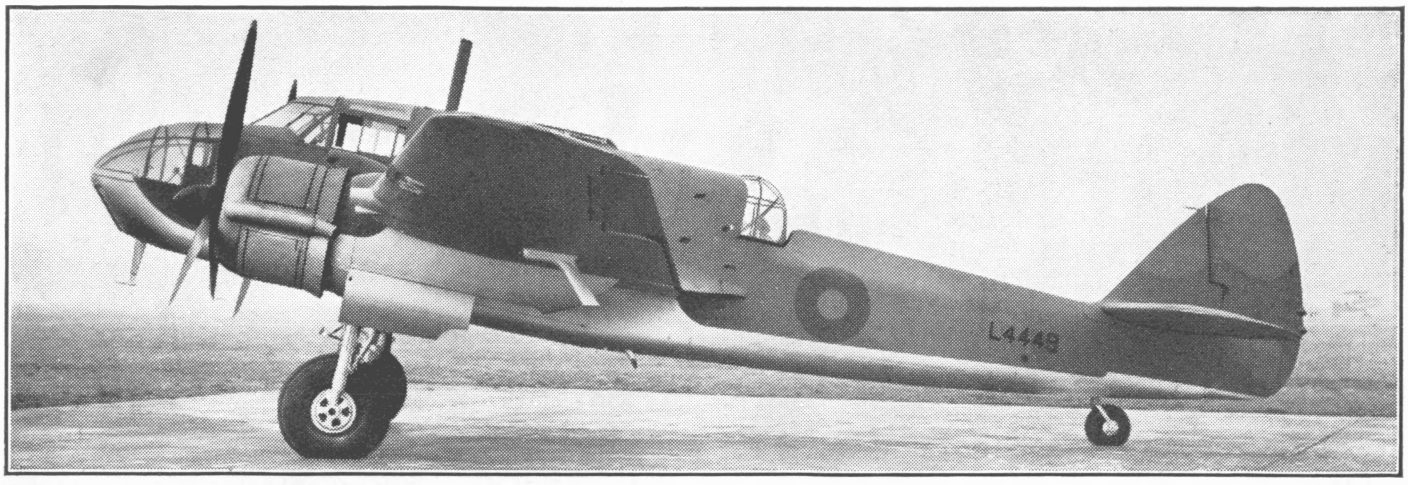
The book is splendidly illustrated by 30 full page plates.

"The Boy Electrician"
By A. P. Morgan and J. W. Sims
(Harrap. 6/- net)

For the reader of the Magazine who enjoys experimenting, and is eager to learn as much as he can of electricity and electrical apparatus, this splendid book, now in its 5th edition, will be the very thing. It is thoroughly up to date, having been entirely re-written and supplied with new illustrations by Mr. Sims.

To begin with magnetism and electricity are explained in a way that is easy to understand, and then instructions are given for making hundreds of fascinating experiments that will satisfy the desire of every reader to see for himself how practically every kind of electrical apparatus works. All the apparatus described has been actually constructed by boys, who have also carried out the experiments, so that the authors know exactly what their readers need to be successful. They explain how to build machines for generating static electricity and how to arrange circuits, and describe the construction of bells and alarms, electrical telegraphs and telephones, shocking coils, transformers, and a host of other fascinating electrical apparatus. Details are given of electrical apparatus developed in recent years for use in industry, transport, gardening and the home. Special chapters are devoted to radio and the construction of practical receivers, the winding and uses of transformers, electric railways and the making of miniature lamps. Other topics include accumulator charging, electro-plating and even the working of an electric organ.

The essentially practical nature of the book is illustrated by the fact that it contains 303 drawings and diagrams for the guidance of the constructor.



The "Bristol" Beaufort, a British twin-engined monoplane used by the Royal Air Force for bombing, general reconnaissance and torpedo bombing, and as a general purpose machine. (See special article on page 241). Photograph by courtesy of The Bristol Aeroplane Co. Ltd.

Pioneer Atlantic Flier Joins the R.A.F.

Sir Arthur Whitten Brown, who with the late Sir John Alcock made the first direct non-stop flight across the Atlantic, has received a commission in the Royal Air Force. He was a pilot in the war of 1914-18.

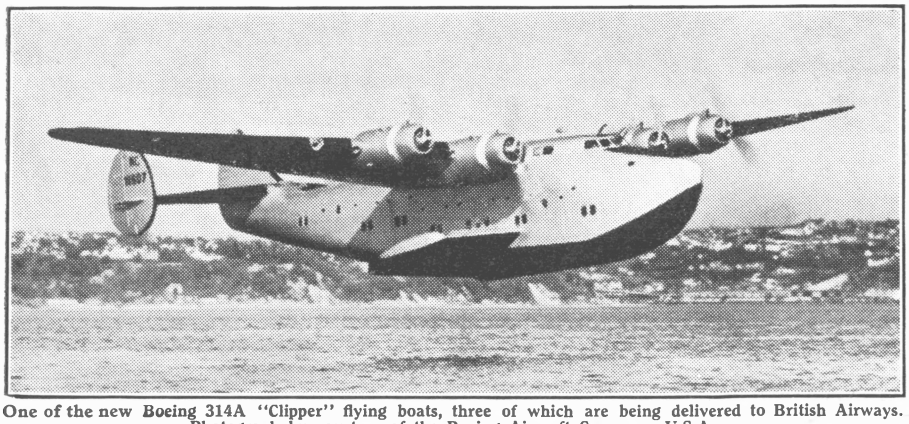
It was on 14th June 1919 that Lieut. Whitten Brown, as he then was, and Capt. Alcock took off from St. John's, Newfoundland, in a Vickers "Vimy" twin-engined biplane that had been used in the war and had been adapted for the transatlantic attempt. The following day they landed at Clifden, in the Irish Free State, after having flown 1,960 miles in 15 hrs. 57 min., at an average speed of about 120 m.p.h. Their achievement caused a great sensation, and was a triumph of courage and navigation.

During recent years Sir Arthur has been associated with the Metropolitan-Vickers organisation.

Royal Observer Corps to the Rescue

A Scottish coastal post of the Royal Observer Corps recently heard the sound of an aeroplane circling the area, which was enveloped in a heavy sea fog. The crew at the post recognised the sound as that of a Lockheed "Hudson" reconnaissance machine, and when it was no longer heard they became anxious. They telephoned to a coastal aerodrome near by and set in motion methods of co-operation with the observer centre and other posts, and they were thus able to keep the coastal station informed of the machine's position.

When the aeroplane approached another aerodrome the coastal station was able to tell this second one to put on its landing lights. These were seen by the pilot of the "Hudson," who was then almost skimming the ground, and by another machine also lost in the fog, and both aircraft made perfect landings.



One of the new Boeing 314A "Clipper" flying boats, three of which are being delivered to British Airways. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

Argentine Air Force Operates Air Mail Service

A weekly air mail service between Buenos Aires and Puerto Aquirre, on the Brazilian border, with two intermediate stops, has been started by the Argentine Air Force. The carriage of mails by part of a State's fighting services recalls the similar venture by the U.S. Air Service in 1934, and the still earlier mail service run by the R.A.F. between Baghdad and Cairo during 1922-6. Both services were subsequently taken over by civil concerns.

Big Orders for New Lockheed Air Liner

In addition to big-scale military aircraft production the Lockheed Aircraft Corporation, U.S.A., are busy on the first of a new commercial type, the Lockheed Model 49, which has been named "Constellation." It is a four-engined machine designed to carry 64 passengers and a crew of seven, and will have a super-charged cabin for comfortable flight at heights of 25,000 ft. to 30,000 ft. Four 2,500 h.p. Wright engines will give it a top speed of over 300 m.p.h., and its calculated cruising speed is 285 m.p.h. It will have a range of 5,000 miles, which will be enough to enable it to fly across the Atlantic to this country and back without refuelling.

Army Training Corps Badge and Motto

"Venture Adventure" has been approved by H.M. the King as the motto of the Air Training Corps, and a badge embodying this motto has also received Royal approval. The badge represents a falcon rising on spread wings and surrounded by a circlet of scarlet and the words *"Air Training Corps"* in gold. An astral crown, with alternating wings and stars, surmounts the design, and at the foot there is a golden scroll bearing the motto of the Corps.

German "T.T." Rider Now Prisoner of War

Hans Schroeder, Nazi "ace" motor cyclist who rode in the Isle of Man T.T. races, is now a prisoner of war in the Middle East. He was flying a Messerschmitt "Me. 109" when he was shot down by an R.A.F. fighter.

When taken to the Mess he was recognised by an officer who had seen him riding in the T.T. races. Very reluctantly the German acknowledged the recognition, and he did not give the Nazi salute. Perhaps he remembered that the German guests had made themselves unpopular in "the Island" when they "heiled Hitler" at the prize-giving in 1938. Schroeder used to speak English fairly well, but when taken prisoner he affected to have forgotten that, too. He admitted, however, that the Luftwaffe were not enjoying desert fighting. They dislike the British "Hurricanes" even more than the fine sand, which, they complain, continually interferes with their engines.

Second Boeing Flying Boat Delivered to British Airways

"Berwick," the second of the three big Boeing 314A flying boats bought by Britain from the United States government, has been delivered to British Airways. It arrived recently at Lisbon, and left shortly afterwards for Bathurst, in East Africa. From Bathurst the present England-West Africa flying boat service runs on to Lagos, where it connects with a trans-Africa landplane service to Cairo. At Cairo, and at Khartoum, connections are made with the Empire "Horseshoe" air route, which operates from Durban via East Africa and India to Sydney, Australia.

AIR NEWS

Mass Production of Curtiss Fighters

The fine photograph on this page shows part of the final assembly shop in the great Curtiss-Wright Corporation's Airplane Division factory at Buffalo, U.S.A., where, it is claimed, fighter aircraft are now being completed at the rate of 10 a day by mass production methods. The types being made in large numbers include Curtiss "Tomahawk" single-seater fighters for the Royal Air Force and Curtiss P-40 pursuit aircraft for the United States Army Air Corps.

The output of Curtiss machines is rapidly being increased, and will be further speeded up when three additional factories are completed this year. One factory is at Buffalo, another at Columbus, and the third at St. Louis. They will produce Curtiss fighters, dive-bombers, scout-observation, and cargo transport aircraft.

World's Biggest Bomber Makes First Flight

The giant Douglas B-19 super-bomber, the largest landplane ever built, has made its first flight. It took off from the aerodrome beside the Douglas factory at Santa Monica, U.S.A., and escorted by six Curtiss "Tomahawk" fighters of the United States Army Air Corps flew to Marsh Field, Riverside, a distance of 75 miles. At the controls was Major S. Umstead, a pilot of great experience, who had spent the fortnight previous to the flight in taxying and other ground tests.

The new bomber must have been an impressive sight as it rose into the air. It has a wing span of 212 ft., roughly equal to the height of a 20-storey building, and its tail unit is 61 ft. across. When resting on its three landing wheels it is 42 ft. 9 in. high to the top of the rudder.

The Douglas B-19 has been designed to have a long range and great striking power rather than high speed, and to be able to fly above the effective range of anti-aircraft guns. It is equipped to carry a crew of 10, with sleeping facilities for eight, and taking off with a full load of 18 tons of bombs it can fly at least 7,500 miles on one fuelling. The four Wright "Duplex-Cyclone" engines mounted in its wings develop a total of at least 8,000 h.p., drive 16 ft. three-bladed airscrews, and give it a top speed of about 200 m.p.h.

Now that the B-19 has flown it will be subjected to the most thorough testing in the air ever given to a new aeroplane. Eventually it will be delivered to the United States Army Air Corps, and is to become a flying laboratory for assembling and checking technical information.

The "Late Arrivals" Club

The members of this exclusive club, formed in the Western Desert, are airmen who have been shot down in action, but by initiative and courage have reached the British lines on foot. They wear a blue and white badge showing a winged flying boot.

Prince Bernhard Now a Qualified Pilot

Prince Bernhard of the Netherlands, who has been training to become a fighter pilot in the Royal Air Force, has successfully completed his course. He wore his wings publicly for the first time when he attended a Netherlands meeting in London recently. The Prince will carry out inspection flights to Netherlands units stationed in this country.

New Wind Tunnel

A third wind tunnel is being added to the research and testing equipment of the Wright-Field Company, of Dayton, U.S.A. It will be suitable for testing model aircraft of up to 15 ft. span, and will be capable of reproducing actual flying conditions at speeds of about 400 m.p.h. The tunnel will be about 600 ft. long, and 45 ft. in diam. at its widest part.

Good Work by R.A.F. Coastal Command Squadron

An R.A.F. Coastal Command squadron has the enviable record of 2,000 hrs. of operational flying in three months without a single accident. Much of the flying was done by night, and in adverse weather that included the intense cold and snow-storms early this year. During the three months the aircraft of the squadron provided escort and protection to many convoys, and intercepted several enemy machines attempting to bomb British and Allied ships in the Atlantic.

Curtiss military aircraft being mass-produced in the Buffalo, U.S.A., factory of the Curtiss-Wright Corporation's Airplane Division, by whose courtesy this photograph is reproduced.

Sun Lamps for Night Fighters

Night fighter pilots are deprived of their normal quota of sunshine and ultra-violet rays because, being on the "night shift," they have to sleep during the daytime. To counteract this, and to help in maintaining their physical fitness at the highest level, Lord Nuffield recently offered to provide facilities for sun ray treatment for them. This special treatment can, if desired, be taken while the night fighter pilots are wearing dark glasses to adapt their eyes for night vision.

The generous offer was readily accepted by Sir Archibald Sinclair, Secretary for Air. Each of the aerodromes at which these pilots are stationed will therefore shortly be equipped with the latest type of collective irradiation apparatus. It will enable the treatment to be enjoyed by up to 12 pilots at the same time.

* * * *

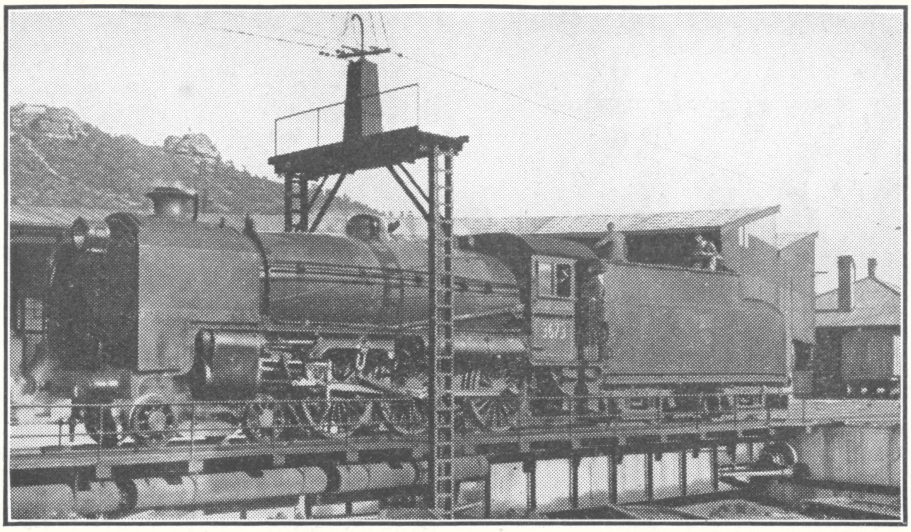
The life story of the late R. J. Mitchell, designer of the world-famous Vickers-Supermarine "Spitfire" fighter, is to be filmed. Leslie Howard, the well-known British actor, will produce the film and also play the part of Mitchell.

A Faster "Master" Trainer

The Miles "Master," one of the fastest trainer aircraft in the world at the time it was introduced into the R.A.F. flying schools shortly before the war, has been given a good deal of extra speed by equipping it with a more powerful engine. The first "Master" had a Rolls-Royce "Kestrel" engine with a maximum output of about 700 h.p., derated for training purposes to around 600 h.p., and its top speed was 250 m.p.h. The latest version, named the "Master" II, has a "Bristol" Mercury engine, a radial type used in such famous aircraft as the early "Bristol" Blenheim bombers and the Gloster "Gladiator" fighters. The change has added something like 30 m.p.h. to the top speed of the machine, and has greatly improved the take-off. Another modification in the new "Master" is an improved type of sliding hood over the cockpits.

* * * *

On 28th June last No. 1 Royal Canadian Air Force Fighter Squadron celebrated the anniversary of its arrival in Britain a year previously. During the year it has accounted for over 50 enemy machines.



No. 3673, one of the "C36" class express locomotives of the New South Wales Railways, and the first to be fitted with deflectors. Photographs on this page by T. Watson, West Leichhardt, New South Wales, Australia.

Easily the fastest running in New South Wales is made by a Diesel-driven train, the *"Silver City Comet,"* which operates between Sydney and Broken Hill in the far west of the State; this includes in its schedule a 41.2-mile stretch, from Trida to Ivanhoe, run at 56.2 m.p.h. The *"Silver City Comet"* is typical of the many interesting innovations recently offered to the travelling public in Australia. Powered by two 330 h.p. engines, this five-car unit is capable of speeds up to 80 m.p.h. The three trailer cars, which run in the centre of the train between the two motor units, are built almost entirely of aluminium alloys, only the headstocks and bolsters being of steel. Very careful consideration has been given to the comfort of the passengers; the saloons are air conditioned, and arrangements are made for warming the air in winter and cooling it in the summer.

Another very important passenger service in New South Wales is operated in the Sydney suburban district. Until a few years ago this was operated entirely by steam, using a small-wheeled 4–6–4 type of tank locomotive. These engines were able to maintain a four-minute frequency of service in the rush hours, and needless to say had to accelerate rapidly from the numerous stops. The Sydney suburban area, from the railway point of view, differs from anything we have in this country. The entire traffic is worked in and out of one enormous station—Sydney Central. The fact that there are no less than eight running lines approaching the station gives some idea of the morning and evening rush, when each line is carrying a passenger train every four minutes. The position has, of course, been greatly eased since the electrification of the suburban area, but if Sydney shares the experience of the Southern Railway in England it will be faced by an ever-increasing traffic as a result.

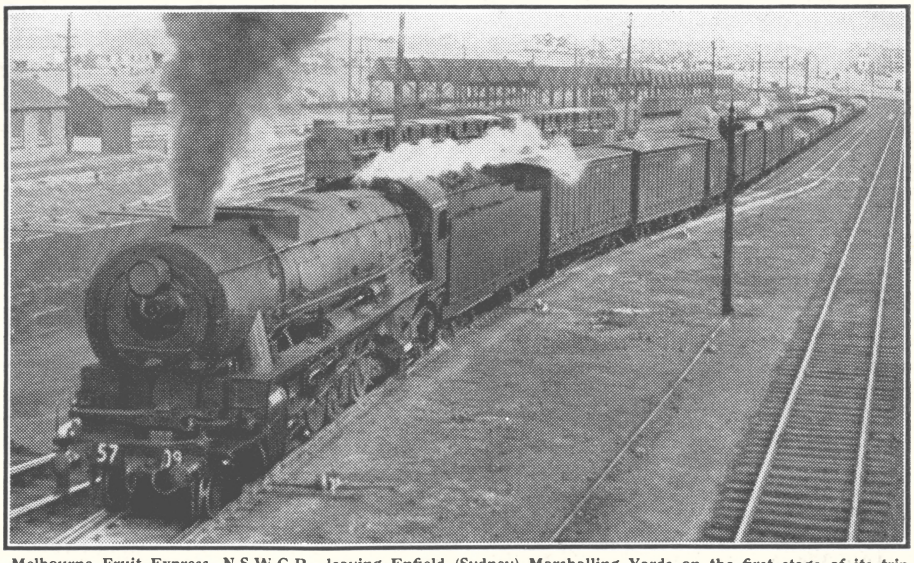
The signalling is automatic, indeed it would be practically impossible to handle such a service in any other way; but here again Australian practice differs from ours. Instead of colour-lights, three-position upper-quadrant semaphore signals are used; these are electrically operated, and are in appearance very similar to those used on the Ealing and Shepherds Bush section of the Great Western Railway in England. This type has become very popular in Australia.

The New South Wales Railways own a very interesting stud of locomotives. Until quite recently nothing larger than 4–6–0s have been used for passenger traffic, though at the present time some streamlined "Pacifics" are under construction. The history of 4–6–0 express locomotives in New South Wales goes back exactly 50 years; for in 1891, three years before the first British 4–6–0 appeared, the famous Manchester firm of Beyer, Peacock and Co. supplied some very fine 4–6–0s to New South Wales. Designed for climbing the Blue Mountains, and other heavy grades, they had coupled wheels only 5 ft. in diameter. It is an astonishing tribute to that pioneer design that modernised examples are not merely still at work, but engaged on some of the most spectacular duties on the system. I have notes of the performance of one of them, now superheated, on no less celebrated a train than the *"Caves Express"*; with a 5-coach train weighing about 120 tons, she went sailing up the 1 in 33 gradients at 24 to 25 m.p.h.

From the original English engines the type has been gradually developed and improved till, in 1925, the very fine "C36" class was turned out, one of which is shown in Mr. Watson's photograph on this page. They have cylinders 23 in. diameter by 26 in. stroke, coupled wheels 5 ft. 9 in. diameter, and a very big taper boiler. The tractive effort is 30,500 lb., a little less than that of a "Royal Scot." These engines undertake the heaviest duties on the system, and despite their comparatively small wheels run freely at speeds up to 70 m.p.h.

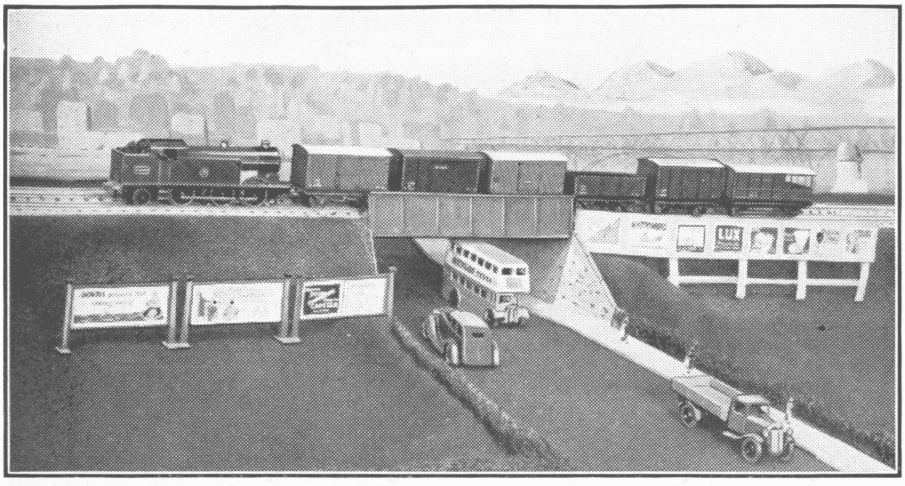
Lately a very interesting practice has been adopted of specially painting the locomotives used on the crack trains, somewhat after the system used on the L.N.E.R. for the Gresley streamlined "Pacifics." The New South Wales 4–6–0s of the "C36" class have been painted green, while some of the veteran "C32" 4–6–0s—the original Beyer, Peacock engines of 1891, modernised—have been painted in a livery of red and black. A further tribute to the efficiency of the "C36s" has recently been paid by the selection of this design, in its entirety, for the new locomotives engaged on the transcontinental service of the Commonwealth line. There they are engaged in through workings over 500 miles long, and are equipped with very large 12-wheeled tenders, with a capacity of 17½ tons of coal and 12,000 gall. of water.

The most outstanding locomotive design in New South Wales is however the giant "Mountain" type freighter. These are three-cylinder simples having 5 ft. coupled wheels, cylinders 23¾ in. diameter by 28 in. stroke, and a working pressure of 200 lb. per sq. in. With such dimensions they are well equipped to handle heavy goods trains over the tremendous gradients of the Blue Mountains, though on a level stretch one of them attained 60 m.p.h. with no less than *two thousand tons* behind the tender. Readers may remember that No. 5706 of this class formed the subject of a very striking cover illustration to the *"M.M."* for September 1939. No. 5709, shown on this page, is hauling the Melbourne fruit express, and is clearly getting under way in fine style although the load is nearly 1,000 tons.



Melbourne Fruit Express, N.S.W.G.R., leaving Enfield (Sydney) Marshalling Yards on the first stage of its trip non-stop to Goulburn, 137 m. Locomotive No. 5709, "Mountain" type, load 987 tons.

Some interesting items about the railways of South, and Western Australia, will be dealt with next month.



A G.W.R. Dublo freight train passing over an effective road bridge. Note the realistic road traffic of Dinky Toys motor vehicles, as suggested in this article.

Lineside Features for Dublo Layouts

IN last month's article dealing with Hornby-Dublo layouts various points connected with lineside features were touched upon. In this article we refer to the same subject in rather more detail.

A railway system, no matter how intricate or extensive in trackwork, never has a "finished" appearance unless some attempt at least is made to develop lineside features in a realistic manner. The actual Hornby-Dublo Accessories themselves, such as Stations, both passenger and goods, Signals and Signal Cabins, provide a railway-like setting to the line, but something more is necessary than these bare essentials if the railway is to have a character of its own. The standard Hornby Hedging and Trees, as we have previously suggested, provide a certain amount of "green" alongside the track, and they are suitable for permanent or temporary layouts.

Good use can be made in various ways of the components of the Dinky Toys Pavement Set. Probably most miniature railway owners, whether Dublo or Gauge 0 enthusiasts, possess one at least of these Sets, and the straight sections are shown in effective use in our upper illustration, where they are seen forming the side walk along a country main road. The pavement pieces are useful too in the neighbourhood of stations, and have a great deal to do with giving a more "civilised" look to railway premises generally. The space between the tracks in goods yards, especially where miniature motor vehicles are to run, can also be paved in this way.

The Pavement Set components have the advantage that they can be cut to fit in special places when the standard lengths or widths are not just right. Cutting should not be attempted with scissors; the material is too thick. A sharp penknife or a razor blade held in one of the special holders that can be got for them will make a clean cut, and a steel rule or a Meccano Strip or Girder should be used as a straight edge to guide the knife or blade. Do not try to cut through the material at one stroke, for too much pressure is liable to cause the cutting tool to run away from the straight edge.

Another use for the straight Pavement Strips is to form walls of medium height to bound the railway property. Station premises, goods yards, car parking grounds and almost any form of enclosure can be arranged satisfactorily with the Pavement Strips. They can be glued or stuck together with Seccotine at corners or other joints where it is necessary to secure them, and they can be anchored to wooden structures when required by means of very fine wire nails or small pins generally used by model makers.

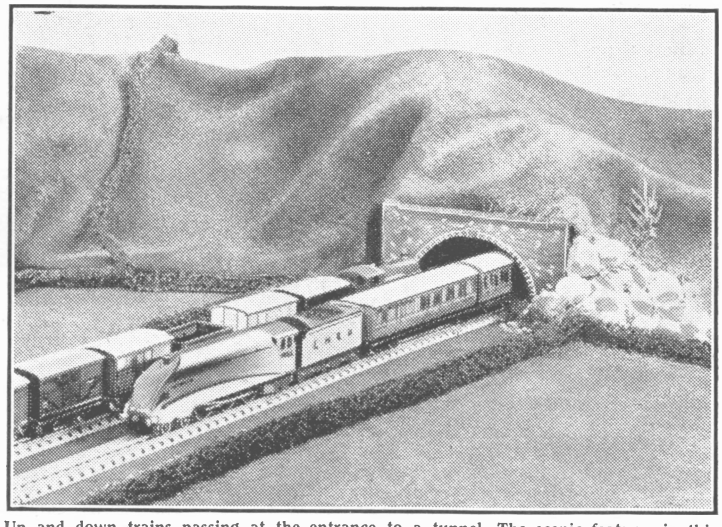
The Hornby-Dublo Stations are provided with a certain number of Miniature Posters, and the standard Hornby Station Hoarding is quite suitable in size for standing "on the ground" in fields, or in station approaches on a Dublo line. In addition the special display hoardings that one sees can be modelled in cardboard or thin wood by the Hornby-Dublo owner who is handy with simple tools. These hoardings are often made to fit in special situations in real practice, and so they frequently will prove useful in miniature in filling up an awkward spot in a realistic manner.

The miniature figures of the Hornby-Dublo range, Station Staff D1 and Passengers D2, are very necessary if the railway is to have a life-like appearance. Station platforms and the line generally, roads, fields and so on are all places where these little people can be placed. The grouping of Passengers on the Stations, or at bus stopping places on the roads, requires some attention. As a rule people congregate in little groups at such spots, but there will always be a few "stragglers" or persons travelling alone.

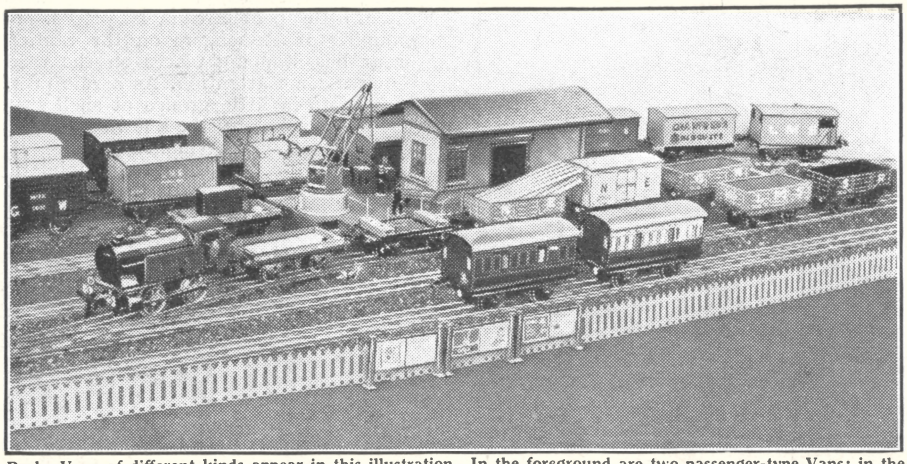
Then again the presence of miniature roads near the line means that road traffic must be represented. For this purpose the various motor vehicles of the Dinky Toys range are ideal. In an article in the "*M.M.*" last January we devoted special attention to the use of suitable vehicles and we have in other articles referred to them on several occasions. The upper illustration on this page shows several typical Dinky Toys running on the road.

In the matter of scenic features particularly the permanent layout is better off than the portable or temporary system. This is specially so where the raising of the track, or rather the lowering of the substructure, is necessary to accommodate such a feature as a raised embankment. Various complete "set pieces" however, such as a road overbridge as described last month, or a scenic tunnel, can be applied to layouts that have to be put away after use. Thin wood or cardboard can be used to form the entrances to the tunnel and these can be of any form according to the fancy or skill of the builder. A plain brick or stone entrance such as that shown in the lower illustration can be employed. Alternatively a more ambitious type of entrance can be used such as that shown on page 251 of this issue, where the northern portal of Clayton Tunnel on the S.R. is illustrated. There are many attractive tunnel mouths in existence in this country, and several of them have been illustrated in the "*M.M.*" and in the "*Hornby Book of Trains*" from time to time. For finishing off the plainer type of tunnel the different kinds of building papers that are sold for miniature railway purposes can be used. For those with more claims to architectural beauty it is best to rely on flat paint; as a rule enthusiasts who are capable of tackling such constructional work can also do the painting satisfactorily.

On temporary layouts it is perhaps best to arrange a tunnel complete on a base, but for permanent systems this is not necessary.



Up and down trains passing at the entrance to a tunnel. The scenic features in this illustration are particularly attractive.



Brake Vans of different kinds appear in this illustration. In the foreground are two passenger-type Vans; in the background a goods Brake Van is at the rear of a freight train.

Hornby Brake Vans and Their Uses

PRACTICALLY every train is completed by a brake van, or at least a vehicle that contains a brake compartment such as the composite vehicles often used on passenger trains. Each type of vehicle is represented in the Hornby Series, but it is the separate brake van with which we are concerned in this article. The Brake Vans of the Hornby Series are of two classes, for goods and for passenger trains respectively; that for passenger trains is invariably described as a Guard's Van in our literature, in order to distinguish it from the goods Brake Van.

The Goods Brake Van is a necessary vehicle to bring up the rear of a freight train on any Hornby railway. In actual practice on ordinary loose-coupled goods trains, the goods brake, in addition to the brakes on the engine, forms the only check on the running of the train on down grades, so that on a hilly route the guard has plenty to do in working the powerful hand brakes with which his van is fitted. The Hornby goods Brake Vans are not provided with brakes as these could not be applied and released when required on the run; but for the sake of appearance and to reproduce actual practice the Brake Van is an important vehicle.

In construction the Brake Vans follow the general style and finish of the standard Hornby No. 1 goods Rolling Stock. The planking of the bodywork is embossed and the finish is carried out by enamelling.

Actually there are two patterns of Brake Van in the Hornby Series. One has lookout windows at each end, but there are the usual side doors, reaching about half-way up the sides of the body, at one end of the Van only. These doors are made to open and they can be latched by the usual wire handles. This Van is finished in L.M.S. and G.W.R. styles and represents types of brake van commonly in use on these systems.

The second pattern, representing L.N.E.R. and S.R. practice, is slightly different in detail. The main part of the body occupies the centre of the vehicle, and at each end there is what may be described as an open verandah. Large openings extend across between the corner pillars and from these pillars to the main part of the body. The lookout from this type of van is excellent whichever way the Van is travelling, and a miniature railwayman figure placed in either verandah looks quite realistic. Opening doors are fitted at each end of the Van so that there are four doors in all.

On both patterns of Brake Van the roof is fitted with a miniature chimney, just as the real vans are, reminding us of the cheering glow of the stove that the goods guard finds so welcome on long night journeys when so much of his travelling is done.

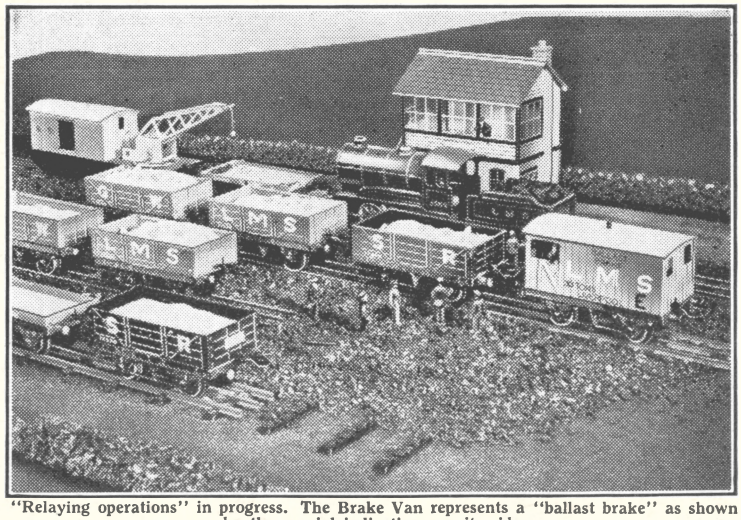
As a general rule under normal conditions the engine and the brake van of a freight train both belong to the same company. At junctions and at big marshalling yards, where traffic is concentrated from different centres, one often sees brake vans belonging to several different railways, but any "foreign" vans invariably have been accompanied by corresponding locomotives from other systems. This is a point to observe in miniature practice where "through" working from another line is supposed to take place.

The Brake Van is suitable for use on any freight train from pick-up mineral to through brake-fitted goods. Sometimes, however, on the latter type of train, and on such as milk, fruit, or parcels trains, brake vans of the passenger type are employed. On a Hornby layout this practice will form an interesting variation, and the Hornby Guard's Van is a useful vehicle for the purpose.

This may be considered a special use of the Guard's Van, but before proceeding to deal with that vehicle there are special uses to which the Brake Van can be put. On most real systems it is the practice to allocate a number of special vehicles to different departments of the railway according to the nature of the work carried out by them. Thus the Engineer's Department requires ballast and other special wagons for permanent way and works maintenance purposes. To use with these there are usually brake vans generally known as "ballast brakes," reserved for this kind of work. Often they have details lettered on their sides as to the department to which they are attached and also the district or station to which they belong. This practice can be followed in miniature, and the lower illustration on this page shows a Hornby Brake Van specially lettered to act as a ballast brake on an "Engineering Department" train at a relaying job. It is not difficult to carry out this lettering in Indian ink with a mapping pen, and readers who adopt the scheme can put on such details as are required on their own systems.

Frequently brake vans used in ordinary traffic working are attached to particular depots. Their work may commence at these places when they are attached to trains already made up in the yards for a main line run. At other times a van may be attached to a "goods pilot" locomotive and will set off with it on a run to various local sidings and goods stations, industrial premises and so on, picking up wagons and forming them into a train to be worked back to the depot for remarshalling and despatch to their destinations. This is a realistic practice to follow in miniature.

Several of the passenger-type Guard's Vans together make up quite a satisfactory parcels or other similar train. In the upper photograph on this page two of these vans are prominent in the foreground. One detail about them that is noticeable is the tail lamp shown on one of the lamp brackets of the Van nearer to the camera. The provision of lamp brackets at each end makes it possible for a tail lamp to be displayed and thus to complete a train in the correct manner.



"Relaying operations" in progress. The Brake Van represents a "ballast brake" as shown by the special indications on its side.

For passenger train service the Guard's Van is most effective; it is tinprinted in the colours and style of each of the four big main line systems and thus matches any passenger train that is likely to be run. Although intended primarily for use with the No. 1 Coaches, which are similar in design and build, the Guard's Van can be run quite well in company with the bogie No. 2 Passenger Coaches.

An Effective Outdoor Hornby System

The *"Nutland Railway"*

WE have received some interesting details regarding the *"Nutland Railway,"* a Gauge 0 system operated mainly by Hornby locomotives and rolling stock, that is owned and "managed" by C. J. E. Morris of Berkhamsted. During the summer months many Hornby railway owners make a practice of transferring their layouts out of doors for a spell of running in the open air, bringing them in again when finished with, as frequently described in these pages in the past. Although a layout may thus be of a temporary outdoor character, if a definite space can be given up to it various constructional works can remain on the site and so be ready for use whenever outdoor operations are desired. The *"Nutland Railway"* includes several features that could be applied to a Hornby system used in the manner suggested, so that the description given here will no doubt appeal to our readers.

The *"Nutland Railway"* derives its name from the fact that its permanent way is laid on a bank that has nut trees growing on it, and the illustration on this page shows that this natural site is quite suitable and realistic. The railway is not a large one, but it has been in successful operation for some three years. It has been extended since the start of its outdoor career, for it was at first a non-continuous line occupying one side of the bank only. Developments have resulted in the completion of an oval track that affords continuous running.

Operating the Nutland Railway described on this page. Our reader C. J. E. Morris, of Berkhamsted, the owner of the system, is on the left.

Two main stations are served by the line, and one of these, appropriately named *"Nutland Lake,"* is shown in the accompanying illustration. It consists of two platforms with three working faces. The platforms themselves have been made in concrete and are thus permanent, while the roof supports and roofs themselves are of timber. They are stoutly constructed and should remain unaffected by the weather for a good time to come. The other station is called *"Hamlington,"* and between them there is a small halt named *"Ashton Halt."* At *"Nutland Lake"* the line is carried on a single span steel bridge built of Meccano parts, and another engineering feature of considerable interest is a reinforced concrete viaduct consisting of three elliptical arches spanning a gap of 114 scale feet. Embankments, cuttings, such structures as those just referred to, and stations if made of wood and well painted, could be installed permanently, even if the track and other details of a Hornby system were removed after each period of running, as they must be to safeguard them against the effects of the weather.

Unlike that of most miniature layouts, the track of the *"Nutland Railway"* is not level throughout. Gradients are incorporated, but perhaps the best way to grasp the chief points connected with the line is to make an imaginary journey over its course. Let us suppose we are going to take a run in a train starting from Platform 2 at *"Nutland Lake."* At the *"right away"* we start, crossing the Meccano bridge previously mentioned. Now we round a curve as we commence the ascent at 1 in 25 that leads us up to *"Ashton Halt."* This passed, we run through a shallow cutting and with another curve swing into *"Hamlington."* A similar gradient brings the line down from the summit at *"Ashton Halt."* From *"Hamlington"* the train passes over the concrete viaduct that is the pride of the line, and enters a deep cutting. The final descent brings us back to *"Nutland Lake"* after a journey of approximately 100 ft. On an average the journey takes just 40 sec. start to stop. The summit point of the line is thus at *"Ashton Halt,"* and the difference in levels at various points on the circuit adds tremendously to the realism and interest of operations.

In spite of the graded profile of the line, clockwork engines are successfully employed as being the most reliable for outdoor use. They are kept well "tuned up," and with loads suited to their capacities give good service. Electrically-operated systems out of doors where the track is permanently laid down are difficult to maintain, chiefly on account of insulation troubles. Clockwork motive power therefore has been adhered to, and for the most part Hornby Locomotives are in use.

No special finish has been adopted for *"Nutland Railway"* stock, nor are the engines of any one company used exclusively, L.M.S., G.W.R. and L.N.E.R. locomotives being employed. The G.W.R. representative is a Hornby Tank Locomotive, and the L.N.E.R. engine is one of the popular No. 2 Special type, *"The Bramham Moor."* There is also an L.M.S. *"Royal Scot"* to share the express work, and a model of one of the former L.N.W.R. *"George the Fifth"* class engines. This is not a Hornby product, but is a useful locomotive for miscellaneous duties. It is finished in L.M.S. passenger red, the style once employed for the engines of this class in real practice. Each of the engines just referred to is shown in the illustration on this page. This illustration incidentally gives a very good idea of the layout at *"Nutland Lake."* It shows in addition the Meccano girder bridge, and another speciality of this system, a concrete embankment laid close alongside the bridge to carry a single line track.

Rolling stock is not numerous, but good use is made of what there is by means of an orderly system of working to timetable. This, as always, has been found superior to the mere haphazard running of trains, and great care is taken in the arrangement of the timetables. Among the vehicles in use are Hornby Pullmans and Saloons, and the goods stock includes the usual open Wagons and covered Vans. As on most outdoor systems, a feature is made of lumber traffic, miniature tree "butts" being readily available, and to deal with this Lumber and other Wagons are employed. In addition there are various Tank Wagons for different types of "liquids in bulk" transport.

Interesting aids to operation are electric colour-light signals, and a buzzer that is used for messages between the two main stations. For a complete operation of the services laid down in the "Working Timetables" four operators are required, two at each main station. One of each pair takes charge of the shunting and general management, while the other operates the signals and the buzzer. Detailed working sheets are made out for the different services. These are kept handy for use at the different control points, and in addition records are kept of trains run, and so on. The illustration shows a friend of the owner of the line making an entry on a "Train Sheet."

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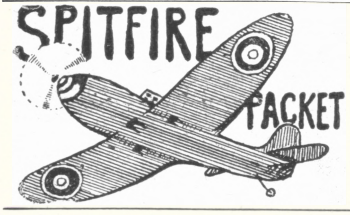

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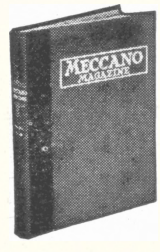


Binding cases for back numbers of the Magazine may be obtained from Messrs. O. H. Bateman and Co., 23, Hanover Street, Liverpool. These are supplied in two sizes (1) for six copies price 5/- and (2) for twelve copies price 7/3, post free in each case. The binding cases are supplied in what is known as "Quarter Basil, full cloth"—that is to say three-quarters of the sides are dark crimson cloth and the back and a quarter of the sides are dark crimson leather as shown here. The case is tastefully embossed in gold with the name "Meccano Magazine," and on the back is the name and volume number.

Binding 6 and 12 copies. These binding cases are supplied so that readers may have their Magazines bound locally, but where desired, the firm mentioned above will bind Meccano Magazines at a charge of 7/6 for six issues or 10/- for twelve issues, including the cost of the binding and also return carriage. The covers of the Magazines may be included or omitted as required, but in the absence of any instructions to the contrary they will be included.

Whilst the binding of the twelve Magazines is quite satisfactory, they form a rather bulky volume and for that reason arrangements have been made to bind six months' Magazines where so desired, as explained above.

STAMP COLLECTING

War Stamps of the Allies—Poland

MANY of us, thinking of Poland's new found independence, dating from the end of the Great War of 1914-18, are apt to think of that country as young. In fact, Kings reigned in Poland 1,000 years ago, and less than 300 years ago the Hohenzollern princes of the Duchy of Prussia, the ancestors of Kaiser Wilhelm of Germany, who died an exile in Holland only a few weeks ago, held their title in fief from the King of Poland. A statue of King Sigismund III, who became also Duke in Prussia in 1618, was shown on the 5 fen. value of the series of stamps prepared for use by the Warsaw Citizens' Post and issued officially in November 1918, overprinted with new values and the official post inscription, as can be seen in one of our illustrations.

Poland has long been one of the cockpits of Europe. The country has had its great days, however. In the early years of the 17th century, Poland for a time ruled Moscow, and in 1683 John Sobieski, a Polish General, saved Vienna from the Turks and placed his country in the vanguard of Western chivalry in the long struggle against the Moslem invaders. The battle against the Turks was celebrated in Poland 250 years later by the issue of a stamp showing the scene as painted by J. Matejko, a Polish artist. Sobieski became King of Poland, and reigned from 1674 until 1696. A statue erected to his memory at Lemberg is shown on the 2 gr. and 30 gr. values of the 1925-26 issue. The higher value of these two stamps is illustrated on this page.

Kosciusko, a Pole who had fought in the American armies in the War of Independence, led peasants and workmen armed only with scythes and hammers against Russian forces at Cracow and Warsaw in a revolt in 1794. The portrait of Kosciusko appears with those of Washington and Pulaski, another Polish hero of the American War of Independence, on a 30 gr. stamp issued in 1932 to commemorate the second centenary of the birth of Washington.

Kosciusko's rising was crushed, but the spirit he roused in the hearts of Polish people has lived to this day. It was evident in 1830 when Poland again rose against the Russian tyrant Nicholas I, a revolution that was commemorated by an issue of four stamps in November 1930. The design showed a rank of Polish infantrymen advancing with bayonets fixed, and is illustrated here. Another stamp that illustrates something of the spirit of Poland of 1830 is the 5 marki from the 1919 issue, reproduced on this page. This shows a Polish Uhlan, one of a great regiment of horsemen that rivalled the Cossacks in daring and bravery.

The revolt of 1830 was followed by another attempt in 1863, after which the Russian Government conceded certain privileges. In view of later events it is interesting to realise that Germany was anxious to prevent the creation of a new independent Poland. Bismarck declared that "Polish independence is equivalent to a strong French army on the Vistula," a reference to the strong pro-French feeling of the Poles. This possibly accounts for the insensate hatred that has marked Hitler's treatment of the country in this war.

Poland, then mainly a Russian State, commenced the war of 1914-18 fighting against the Central Powers, Austria and Germany, but a band of Polish irregulars, led by General Pilsudski, slipped over the frontier into Austria only a few hours before war was declared. Pilsudski had been waging guerilla warfare against the Russian Government since 1908 and had inspired many acts of sabotage within Russia. He foresaw the war, and saw in it an opportunity to strike a blow for Poland's freedom, but within a few months it became clear that Austria was not interested in Pilsudski except as a means of waging war for Austrian interests.

In the autumn of 1915, when the Germans had occupied Poland, Pilsudski, whose portrait appears on several Polish stamps, the first being the 25f. value of the 1919 issue illustrated here, returned to the country and rejoiced in the new liberties given to the Poles. They were given their own law courts, and permitted to re-establish Polish education and to re-open the Polish University at Warsaw. These concessions were short-lived, however. In the spring of 1916 all were withdrawn by the Germans, and Pilsudski indeed became a prisoner of war in the hands of the powers for whom he had fought at the opening of the war. This was the result of his struggle with the Germans for the formation of an independent Polish army in place of Polish divisions of the German army. He suspected Germany of not intending to keep her promises of independence for Poland after the war, despite the declared views of all the world powers, the United States, Britain and France, for example, that Polish independence should be granted whatever the outcome of the war.

There is not space to detail the internal strife and the struggle that went on between the Polish patriots and the warring powers. Instead we can pass on to the next stage, the final triumph of Poland's cause at the Paris Peace Conference, pausing only to touch on the various stamps issued by Germany and Austria for use in Poland during the period of their occupation.

Three different issues, two from Germany and one from Austria, are illustrated here. All of these consisted of contemporary stamps of Austria and Germany overprinted with appropriate inscriptions and values. The same stamps were subsequently overprinted a second time with new values and inscribed "*Poczta Polska*" in December 1918 and January 1919, when the Polish people declared their independence at the end of the war.

We have already referred to the stand that the United States had taken for Polish independence. Very largely the credit for this must be given to the great Polish pianist-politican, Ignace Paderewski, who died only last month. Paderewski gave up his great musical career to devote all his energies to fighting his country's cause, first in the United States and later at the Peace Conference at Paris. His work was crowned when he

(*Continued on page 264*)

War Stamps of Poland—

(*Continued from page 263*)

became first President of the new Polish State in 1919, and a portrait of the great pianist appeared on the 15f. value of the 1919 issue celebrating the inaugural meeting of Poland's first National Assembly. Peace did not come finally until 1923, when the Treaty of Riga between Soviet Russia and Poland cleared up the outstanding problems of frontiers and possessions.

Then followed 16 years of peace for Poland, marked by occasional minor differences with her Baltic neighbours, before German ambition to expand eastward reasserted itself and brought the present war. The gallant fight of Poland against the lightning methods of the overwhelming German strength can be marked by the inclusion of the 25 qr. stamp issued in 1937, on which appears the portrait of Marshal Smigly-Ridz, who played so great a part in the brief struggle before Germany overcame his armies.

The 25th anniversary of the formation of Pilsudski's Polish Legion was commemorated by the issue of the 25gr. stamp illustrated on this page. The colour of the stamp is purple, and the design shows the great patriot himself in the centre, with the legionaries of 1941 on the left and Polish soldiers of 1939 on the right.

The war stamp story of Poland is by no means complete, but for the final chapters we must wait until the end of the present struggle. Then will come stamps that will tell of Poland's endurance and bravery under the greatest oppression that the country has ever endured. Poland will certainly rise again—Britain is pledged to achieve the independence of the country—

and almost certainly one of the first stamps that will appear when the new Polish regime has been established will celebrate the triumph of Anglo-Polish arms over the country's oppressors.

We thank David Field Ltd., 7, Vigo St., London W.1, for their courtesy in loaning the stamps from which the illustrations for our stamp pages have been made.

Stamp Gossip

and Notes on New Issues

The Free French Colonial Issues

In our last issue we referred to the new Free French issue from Equatorial Africa. Unfortunately it was found impossible to obtain specimens for illustration, and inadvertently we omitted to delete the reference to "the specimens illustrated on this page."

Supplies are now available, and readers will be interested to see the accompanying illustrations of specimens from both the ordinary and air mail issues of Equatorial Africa, and also from the issues of the French Cameroons and the French Settlements in India. The portrait on the ordinary issue of Equatorial Africa is that of Count de Brazza, a French explorer of the country.

Every reader who can do so should make a point of securing copies, complete sets if possible, of these stamps. They are certain to rise in value after the war, for every stamp collector in France will wish to obtain them. It can be taken for granted that they cannot do so now, for both the Vichy Government and the Nazis will take good care that none of these stamps are sold in France while they rule the country. Furthermore, the original printing plates are held in Paris, and when supplies of the present printing run out, either a new series of designs or mere reproductions of the present ones will have to be employed. Everything considered, these first provisional issues are likely to prove unusually good investments.

As an illustration of how good an investment the "right" stamps can be, it is only necessary to turn to the Silver Jubilee issues of the British Empire, issued in 1935 to celebrate the 25th year of the reign of King George V. The complete set in unused condition could have been bought then for about four guineas, and only a little more was asked for used sets. In London last month an unused set brought £28 and a used one £36 when sold at auction at Harmer's of Bond Street, although as yet it is only six years since these attractive stamps were issued.

New British Colonial Printings

Readers will be interested to see reproduced on this page the new design recently introduced for the stamps of the Sudan. The stamp shown is one of an issue of three stamps, the others being 3 piastres and 4p. values bearing the same design but in double size. They were produced for the Sudan by the Indian Government Printing Office at Nasik, the first of many Colonial issues that are to be produced there as a means of ensuring regular supplies for British Colonies unable to obtain regular and certain supplies from the usual London printers.

* * * *

The Union of South Africa is considering the introduction of a set of eight stamps, each bearing a design depicting some branch of the Dominion's war activities, to replace the existing series for the duration of the war.

* * * *

Bermuda is shortly to issue a new 7½d. value to meet conditions arising out of altered postal rates. The design will show a Bermuda tropical bird in flight, the Bermudiana, Bermuda's national flower, the arms of the Colony, and a portrait of King George VI.

* * * *

Next Month's Article

The "War Stamps of the Allies" series will be continued in our next issue when we hope to deal with the stamps of Russia, the latest addition to the countries joining in the fight against Nazi aggression. We hope to include among the illustrations to this article specimens from the recent "Defence Series" issued by Russia to celebrate the 23rd anniversary of the founding of the "Red Army and Navy." The designs are a striking series depicting modern military activities and will form a most interesting background to the story.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

Prague's Famous Clock

I was greatly interested in the article on curious clocks that appeared in the October 1940 issue and I can add an even more wonderful example to those given in it. This is the famous Golden Clock on the Town Hall at Prague, one of the most celebrated astronomical clocks in Europe. I visited the city a year or so before the Germans marched into it and I photographed the clock while I was staying there.

The famous astronomical clock on the Town Hall, Prague. Photograph by E. Richardson, West Bridgford.

Hanush, the 15th century craftsman who made the clock, had his eyes put out by the aldermen of the city so that he should not make another—a pleasant custom of the times. The worthy owners of the clock were so pleased with the clock that they did not wish any other city to possess one like it! But Hanush had his revenge. The story is that he begged to be allowed to stand before his work as it struck and he is said to have managed to damage it so badly that it was 100 years before it could be made to go again.

I was lucky enough to see the clock strike. If I remember rightly, it does not indicate ordinary time, but strikes its hours in accordance with the local time used in Prague some centuries ago. Death first strikes the hour. Then a Jew appears and shakes his money-bags, after which a door opens and the Twelve Apostles come out in two groups, of six each, that meet each other. As Peter, the last apostle, disappears, a cock crows.

The dial shows the 24 hours of the day, and is subdivided into two sets of 12 each. The positions of the Sun and Earth with respect to the Signs of the Zodiac also are indicated.

E. Richardson (West Bridgford).

A Slate Quarry in North Wales

During a holiday in North Wales I visited the Penryhn Slate Quarry, where I found the quarrymen most willing to describe the methods they use. This quarry has been in existence since 1750, when pack horses were used to carry the slates to the sea at Bangor. Now there are 40 miles of railway track in the quarry itself and most of the machinery is driven by electricity.

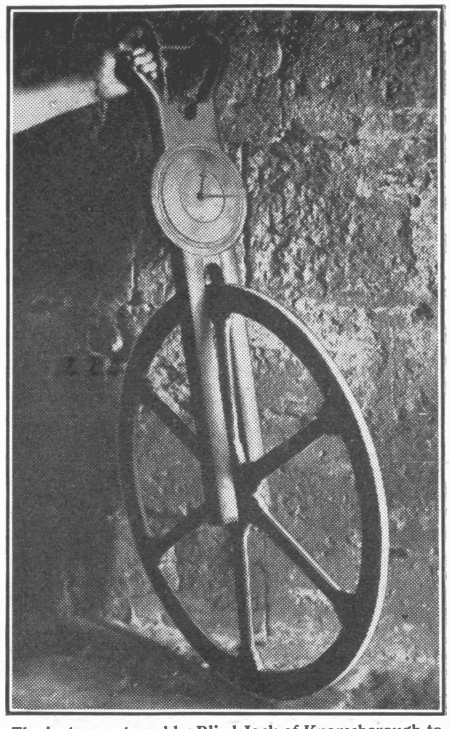
Slate is obtained in three colours, blue, which is the most common, red and green. A proportion of the material brought up is of no use owing to its having blemishes or being cross-grained, and this is deposited on dumps near by. The quarry is a gigantic hole, with mountains rising around it. It is worked in steps all round, each being about 40 ft. in height, and blasting is carried out several times a day, a traditional bugle call warning all men at work in the quarry that they must take cover in small shelters built of slate, for there is a risk that one of the charges may bring down huge rocks. When all the charges have exploded, the slate that has been loosened is loaded into small trucks called "tubs" and brought to the top.

Good slate is sawn into more easily-handled blocks by means of circular saws driven electrically. It is then sent to be split and trimmed, very skilled jobs for which years of practice are required to give proficiency. Though trimming is now mostly done by machines, splitting is always done by hand with hammer and chisel. This is the first step, yielding thin slates with uneven edges. These are trimmed to one of the standard sizes, known by such romantic names as Queens and Duchesses, and are then ready for dispatch.

I was then shown how the waste is disposed of. Some is still put on the dumps, but much of it is ground into small chippings for making into bricks by mixing with cement and casting in moulds. As the mixture is stiff enough to retain its shape it is taken out before it is dry and the mould is used again. Still more waste is ground into very fine powder by a machine that looks like a giant concrete mixer. The slate is fed in at one end and comes out at the other in the form of a powder as fine as flour. This product is used in making gramophone records, and also is mixed with bitumen in making roads. The slates, bricks and powder are taken to Port Penryhn, seven miles away, on the 2 ft. gauge railway owned by the quarry. A photograph of one of the locomotives employed is reproduced on this page.

D. J. Williams (London S.W.15).

A locomotive on the 2 ft. gauge railway at the Penryhn Slate Quarry. Photograph by D. J. Williams, London.



The instrument used by Blind Jack of Knaresborough to measure distances. Photograph by G. B. Wood, Leeds.

Blind Man's "Way Wiser"

When visiting Knaresborough Castle recently I noticed a curious variety of the old-fashioned "way wiser," an instrument that bygone map-makers and surveyors used for measuring mileages; they pushed the wheeled contrivance before them and took their "readings" from a dial fixed at the handle.

Knaresborough's relic differs from others in having raised pointers on the dial. The explanation is that this instrument was used by Jack Metcalfe, the famous 18th-century road-maker and surveyor, who was blind! The raised pointers enabled him to take his "readings" without difficulty. Metcalfe's disability certainly did not prevent him from becoming a successful road engineer, and he also built bridges that resisted floods so heavy that other bridges exposed to them collapsed.

Alongside this relic is the staff "Blind Jack" carried on his road-making journeys.

G. B. Wood (Leeds).

Canada's Newest Gold Mines

Canada's farthest north gold mines, which only began to yield the metal in September 1938, had a record year in 1940. The centre of the district in which they are placed is Yellowknife, on the shores of the Great Slave Lake, 600 miles north of Edmonton. Little more than two years ago this was only a prospector's settlement, which was described in an article in the May 1939 "*M.M.*" Now it has a population of 1,300 with shops of all kinds, a picture house, taxi garages, and four wireless stations, besides two churches, a new school, restaurants and a cabaret. The aeroplane has played a great part in opening up the country to prospectors and miners, and indeed it can only be reached by air during the long winter, when the temperature may be 50 deg. F. below zero.

Three mines are at present producing in the Yellowknife area and last year they yielded 54,869 oz. of gold, valued at nearly £500,000, the largest amount yet mined there. Altogether gold to the value of nearly £1,000,000 has now been produced, and the yield will increase rapidly, as four more mines are expected to be brought into production in the near future. This year hydro-electric power from a 4,200 h.p. plant for the town will become available.

Automatic Detectors for Fire Bombs

It is strenuous work keeping watch for fire bombs in large buildings, especially those with many rooms and stores that are not open, and in which a bomb may burn undetected for a considerable time. In view of this it is not surprising to find that inventors have been at work in order to discover means of detecting the bombs without actually seeing them. With apparatus of this kind at their disposal firewatchers can remain in shelter until their services are needed.

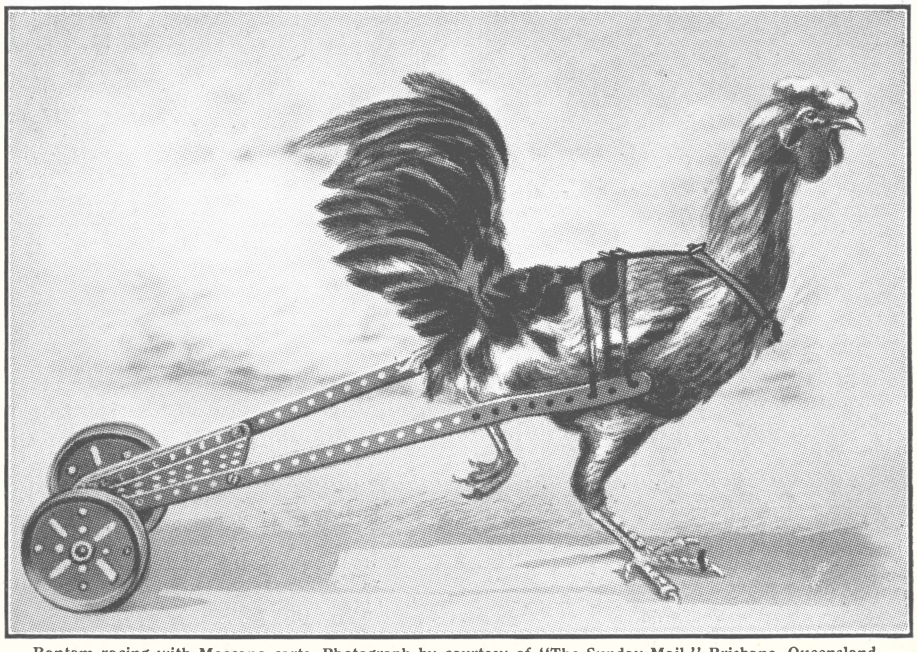
The most remarkable of the devices that have so far been introduced employs a selenium cell. Selenium has the curious property that its resistance to the passage through it of an electric current is altered when light falls upon it. Because of this the cell can be incorporated in electric bell circuits arranged so that the current flows when the selenium cell is exposed to the glare of an incendiary. This device is called the Radiovisor Automatic Fire Bomb Detector. It is sturdily made and cannot get out of order, and is suitable for use both inside and outside buildings. The outfits are placed in key positions, and an indicator installed in conjunction with the bell can show where bombs have fallen, just as the indicator of a domestic bell system shows in which room the switch button is being pressed.

Another system that has been introduced makes use of a kind of grid of wires, four inches apart, placed in the roof of a building, and arranged so that the breakage of a wire results in the ringing of an alarm bell. An indicator can be used with this method in order to show where incendiaries have to be dealt with. An ingenious addition is one to help in dealing with bombs in rooms that cannot normally be left open. Here the key is hung inside the door above a small trap. It is released automatically when the detecting device comes into operation, and can then be obtained by pressing a button on the outside of the door, that causes it to be delivered through a slot.

Bantam Racing with Meccano Carts

Meccano has added to the joy of life in many curious ways. We are indebted to "*The Sunday Mail*," Brisbane, Queensland, Australia, for the accompanying illustration, which shows the latest humorous application of the world-famous toy.

"Three Clayfield boys," says "*The Sunday Mail*," have thought out something new in racing. They run a bantam rooster Derby up and down the cement car tracks in their front garden, and the speed the birds attain is a revelation. The photograph shows one of the contestants making a bit of pace. The boys are Lex and Peter Stevenson, sons of Mr. and Mrs. A. A. Stevenson, and Donald Thomson, son of Mr. and Mrs. A. F. Thomson, of Collins Street, Clayfield, who are next-door neighbours. They all keep bantams, and Lex thought out this grand scheme of building tiny carts of Meccano parts, and harnessing their pets.



Bantam racing with Meccano carts. Photograph by courtesy of "The Sunday Mail," Brisbane, Queensland, Australia.

"The pets don't seem to mind, and, lured on by a handful of grain and a few hearty cheers, they make a great race of it. Sometimes they don't stick to the cement, but run a cross country event on the lawns, and then the fun is fast and furious.

"Mrs. Thomson tells how her two elder boys, now with the A.I.F. and R.A.A.F., once tried harnessing guinea-pigs, but the guinea-pigs 'were inclined to jib.' They didn't enter into the spirit of the thing like the bantams, and they didn't seem to have the speed."

If any other readers know of curiosities of this kind we shall be glad to hear about them.

* * * *

The amount of energy that is expended in talking is amazingly small, and the mere act of lifting a telephone from its support requires energy sufficient to keep the actual conversation going for thousands of years. The diaphragm of the transmitter is made to vibrate by the impact of air particles weighing about as much as a human hair.

Bath Characters

According to legend the curative powers of the waters of Bath were discovered by the British Prince Bladud, who was expelled from his father's court because of leprosy, and was sent to tend pigs on Lansdown, north of the present site of the town. There he saw the pigs wallowing in the Bath mud, coming out much better than when they went in. He followed their example and was cured. The Prince became king when his father died and was the founder of Bath.

The story of Bath certainly began early. The Romans realised the value of the waters and built the famous baths. Queen Elizabeth made Bath a royal borough, but complained of the smells.

Among famous Bath characters was Beau Nash, who in the 18th Century was the fashion king of the city. Ralph Allen, who in 1729 organised a system of posts across country and made an immense fortune as a result, was originally a post-office clerk there. He also owned a quarry on Combe Down, south of the town, from which he transported the stone to Bath on a tramway. Another Bath notable was Dr. Oliver, the inventor of the famous biscuit known by his name.

I. MARSHALL LANG (Bath).

Aeroplane Photographs

Our advertisers Real Photographs Co., Liverpool, have recently produced a new list, No. 12, of the aeroplane photographs that they are able to supply. This is a comprehensive list of 1,500 titles, including those from recent supplementary issues, and covers a very large range of civil and military aeroplanes. The latter are carefully classified, so that it is easy to discover whether a photograph of any particular aeroplane is included. Many aircraft are represented by several different photographs, and an ingenious system of reference numbers tells prospective purchasers what kinds of view these give. British, Canadian and United States machines predominate, but others from various countries, including those of our enemies, are represented, together with a large number of historical aeroplanes. There are also pictures of formation flying, aero engines, famous airmen and lighter-than-air craft. Details are given of cabinets and albums for the use of collectors.

The list is published at 2d., and a copy will be sent with a specimen photograph to any reader of the "*M.M.*" who forwards 4d. in stamps to Real Photographs Co., Tulketh Chambers, Southport. The "*M.M.*" should be mentioned when writing.

COMPETITIONS! OPEN TO ALL READERS

Engineering Nightmares!

Some years ago Pawl, our well-known office boy, suffered agonies while being pursued by terrifying animals, with extraordinary names that we made the subject of a very popular competition. We now present a similar contest, but instead of being based on the names of animals it is concerned with the names of engineering materials and parts, including Meccano parts.

The names that readers are asked to discover are divided into two parts, the first of which is the name of an engineering structure or part and the second an ordinary English word. The essential feature is that the last three letters of the first part of each name are also the first three letters of the second part, and the clues given in the panel on this page will guide readers in building up the extraordinary words themselves.

This will be made clear by an example. The clues to No. 1 are "A bent lever" and "Part of the Body." The first clue points to a *"Crank"* and the part of the body clearly must be *"Ankle,"* since the first three letters must be *"Ank."* Putting these together we get the splendid word *"Crankle,"* which clearly indicates some engineering operation of an extraordinary character!

	CLUES TO FIRST PART.	CLUES TO SECOND PART.
1.	A bent lever.	Part of the body.
2.	A beam supporting a floor or wall.	Scorn or mockery.
3.	Tooth that engages with a chain.	A flavouring sauce.
4.	Connection for transmitting movement.	Cast piece of metal.
5.	Tool for tightening nuts.	Sensitive fibre.
6.	Circular metal disc.	Gives increased strength.
7.	Machine that lifts weights.	A tale.
8.	Bar used for applying great pressure.	The truth.
9.	The spread of an arch or suspension.	Breathe rapidly.
10.	Part cut off.	Competitor's effort.
11.	An assembly that rotates.	A destructive tropical storm.
12.	Attractive piece of metal.	A stinging plant.
13.	Arm passing on intermittent motion.	A small bomb.
14.	Machine that generates electricity.	Excited to madness.
15.	For cooling water.	Crowded.
16.	Turned round by pressure of water or steam.	Cannot be avoided.
17.	Machine for squeezing.	Perfume.
18.	A spinning top mounted in gimbal bearings.	A musical play.
19.	A boring instrument.	Not allowed.
20.	Point of balance of lever.	A low continuous noise.

Prizes of 21/–, 15/– and 10/6 are offered to the readers who submit the best attempts to name the full set of 20 names, in each of the two sections, Home and Overseas. In addition there will be several consolation prizes, and competitors therefore should send in their lists, even if they are unable to find all the names.

In the event of no one succeeding in solving the complete list of names the prizes will be awarded to the next best entries. There will be a number of consolation prizes and in the event of a tie for any or all of the prizes the judges will take into account neatness and novelty of presentation.

Entries should be addressed to *"Engineering Nightmares, Meccano Magazine, Binns Road, Liverpool 13,"* and must reach this office not later than 30th August, Overseas closing date 31st December.

A Novel Engine Names Contest

The practice of naming locomotives is one that is appreciated by all *"M.M."* readers, who recognise locomotives of different classes by their names, and indeed learn to look upon them as being almost alive and certainly full of attractions. The names that are used cover an amazing range. On one railway we have Cities, Abbeys and Castles, on another we have the names of Admirals and Shipping lines, while famous race-horses, birds, beasts and even aeroplanes have been pressed into service to supply names for locomotives. Some of the more remarkable of these names are the basis of our contest this month. The names themselves are not given. Instead we have clues to these, and the reader is asked to decide from the information given what engine name is intended, and to give also the number, class, wheel arrangement and title of the owning company.

Here are the clues: **1. Father of the Seas; 2. Famous for its Heights; 3. Lightgivers; 4. Coloured Glove; 5. Cooling; 6. It is necessary to put this when the rails are slippery; 7. Famous rock; 8. Scientist; 9. Made at the beginning of every year; 10. Royal Angler; 11. Songster; 12. Part of a ship and a City; 13. Fought in the Arena; 14. From a Lighthouse; 15. He built the Pen-y-Darran Locomotive; 16. Deck of a ship, also a lamp.**

Some of these are direct and easy, but others are decidedly tricky. Perhaps the easiest of them is the first, which may be given as an example of what has to be done. The clue is "Father of the Seas," who can be none other than Neptune, and accordingly *"Neptune"* is the engine name that is the solution to No. 1. "Neptune's" number is 5687, and it is a 4–6–0 of the "Jubilee" class of the L.M.S.

One great advantage of this contest is that it is suitable for the holiday month of August. All that the reader needs in order to solve the puzzles is a pencil and paper on which to write down the names.

When the full list has been written out it should be forwarded to *"Engine Names Contest, Meccano Magazine, Binns Road, Liverpool 13,"* and the entry must have clearly written on it the name and address of the competitor. Even if all the engine names concerned cannot be found an entry should be sent in, for there will be a large number of prizes, including consolation prizes, and every competitor should bear in mind that others may not be any more skilful than himself in following up the clues, or more industrious in filling in the remaining details required.

The competition will be divided into the usual two sections, for Home and Overseas readers respectively, and in each there will be three prizes of 21/–, 10/6 and 5/–, with several consolation prizes. The closing dates are: Home section, 30th August; Overseas section, 31st December.

August Photographic Contest

Here is the fifth of our 1941 series of photographic competitions, in which competitors are asked to submit photographs of any kind that they have taken themselves. An entry may consist of more than one photograph, but each print submitted must have on the back of it a title. If a photograph is given a general or fancy title the real name of the place shown also must be written on the back, while the competitor's name and address, and age also must be given.

It is not necessary that the developing and printing should have been done by the competitor. These can have been carried out professionally, so long as the entrant himself has made the exposure. Competitors should take care to avoid including in their photographs any scenes or objects of military, naval or Air Force interest.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16, and in each section prizes of 15/– and 7/6 respectively will be awarded. There will be similar sections and prizes for Overseas readers, with consolation prizes in each section.

Entries in this month's competition should be addressed *"August Photo Contest, Meccano Magazine, Binns Road, Liverpool 13."* The closing dates are: Home section, 30th August; Overseas section, 31st December.

FIRESIDE FUN

NOT LIKELY!

"When is the next train to Albany?"
"Twelve o'clock, sir."
"What, isn't there one before that?"
"No, sir. We never run one before the next."

* * * *

Tramp (to pal): "Lumme, Bill, don't blow on your tea like that. It's plain ignorance—fan it with your cap, as I do."

* * * *

American Car Conductor: "Next station is Long Wait Junction. Change cars for Mauch Chunk, Squeedunk, Quakake and Podunk, Hokendaqua, Castasaqua, Mecanaqua and Tamaqua."
Brakeman (at other end of car): "Same at this end."

* * * *

A Dublin doctor sent a bill to a lady as follows:
"To curing your husband till he died."

* * * *

During recent military exercises one side captured the other's general. An envoy was sent to negotiate his exchange.
"We will give you four colonels for him," said the envoy.
The offer was declined.
"Eight majors?"
"No!"
"What, then?"
"We have given the matter most careful consideration, and the least we can accept is two dozen tins of condensed milk."

* * * *

Teacher: "What happened in the year 1809?"
Johnny: "Lincoln was born."
Teacher: "Correct. Now, what happened in 1812?"
Johnny (after a pause): "Lincoln had his third birthday."

* * * *

"You know," said Mrs. Jones. "My husband plays the organ."
"If things don't improve," replied Mrs. Smith, "My husband will have to get one, too."

* * * *

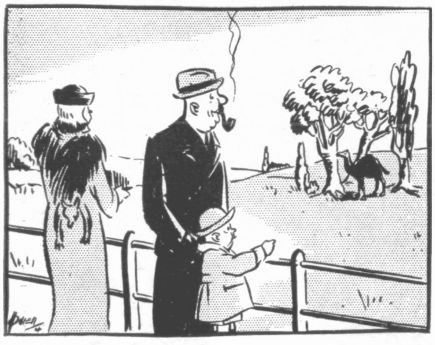
"So you're going to be a doctor?"
"Yes, sir."
"And why have you decided upon that profession?"
"Well, a doctor is the only man that is paid whether his work is satisfactory or not!"

* * * *

A soldier went to his colonel and asked for leave to go home to help his wife with her spring cleaning. "I don't like to refuse you," said the colonel, "but I've just received a letter from your wife saying that you are of no use around the house." The soldier saluted and turned to go. At the door he stopped, turned and remarked: "Colonel, there are two persons in this regiment who handle the truth loosely, and I'm one of them. I'm not married."

* * * *

HUMP-BACKED!



Tony (seeing a Camel for the first time): "Look Dad! Isn't that horse warped."

MORE TONGUE TWISTERS

Bob bought a black back bath brush
Frank threw Fred three free throws.

* * * *

Sergeant: "Occupation?"
Recruit: "Well, my gov'nor died and left me a pot of money and I ran through it."
The Sergeant wrote down: "Brass finisher."

* * * *

OBVIOUSLY!

"Good gracious Mary! More dishes?"
"No, Mum, less!"

* * * *

Jack: "How can one avoid falling hair?"
Bob: "Jump out of the way."

* * * *

Dick: "What has four legs and can jump as high as the Nelson Column?"
Tim: "A dead horse."
Dick: "But a dead horse can't jump."
Tim: "Neither can the Nelson Column."

* * * *

A picknicker, close by Nuneaton,
A part of his meal left uneaten,
The inspector of litter
Said in terms a bit bitter,
"Get that uneaten Nuneaton bun eaten."

* * * *

Uncle: "How many times have you been spanked at school this week?"
Johnny: "I don't take any notice of what's going on behind my back."

* * * *

Customer: "Does a man with as little hair as I've got have to pay full price to have it cut?"
Barber: "Yes, and sometimes more. We usually charge double when we have to hunt for the hair."

* * * *

Landlord: "I intend to raise your rent next month."
Tenant: "That's kind of you. I was just wondering how I was going to raise it myself."

* * * *

"In the Arctic they live on candles and blubber."
"Well, if I had to eat candles, I think I would, too."

* * * *

"When I was a lad," said the millionaire, who was telling his friends some of his troubles in early life, "I worked in a mine in Devonshire, and after five years' hard work saved enough to buy a bicycle." There was a gasp of astonishment. "Not long after this Mother became very ill. I jumped on my bicycle and rode to London, just in time to hear the doctor say that Devon air was the only thing that would save her life. His audience gasped.
"You didn't take her back," they said.
"No," replied the millionaire. "I dragged the old bike into the room, let the wind out of the tyres, and Mother's alive to-day."

* * * *

THIS MONTH'S HOWLER

The difference between air and water is that air can be made wetter and water cannot.

SAFETY LAST

Young Aeronaut: "The mater's awfully good to me. She gave me this aeroplane as a birthday present."
His friend: "Very nice. What did your father give you?"
"Oh, he insured my life for a couple of thousand."

* * * *

Little boy: "Apof of toffee tids all yads."
The shop assistant took down a box labelled "Toffee Babies" and gave him a ha'porth, all lads.

* * * *

Boss (to new office-boy who is two hours late): "Do you see this watch, my boy?"
Boy: "Gosh, what a beauty! Where did you find it?"

* * * *

The Sunday morning visitor to the Navy yard approached a sentry.
"Can you direct me to H.M.S. '*Satan*'?" he asked.
"Never heard of it," said the sentry.
"That's odd," said the stranger, as he reached in his pocket for a newspaper clipping and read: "Next Sunday, the Navy yard chaplain will preach on Satan, the great destroyer."

* * * *

A small boy at the zoo asked why the giraffe had such a long neck.
"Well, you see," said the keeper gravely, "the giraffe's head is so far removed from his body that a long neck is absolutely necessary."

* * * *

Golfing Novice: "I seem to be improving. Can you see any difference?"
Fed-up Caddy: "Yus—you've 'ad your 'air cut."

* * * *

Father: "When I was a little boy, I always ate the crusts."
Willie: "Did you like them?"
Father: "Of course I did!"
Willie: "Then you have mine."

* * * *

Customer: "I suppose I can sit here till I starve!"
Waiter: "Sorry! No, sir—we close at ten o'clock."

* * * *

The schoolmaster was explaining to his class of small boys the nature of common fractions.
"If I take a potato, cut it in half, then in quarters, and then in halves again, what shall I have?"
"Chips, sir," was the unexpected response!

* * * *

A Scotsman's dog stole a bit of meat from a butcher's shop.
"Is that your dog?" asked the butcher.
"It was," said the Scotsman, "but he's keeping himself, now."

* * *

Mother: "Sonny, step over and see how old Mrs. Harris is this morning."
Sonny (on his return): "Seventy-three years, six months, and two days, she says."

* * * *

A man went round to see one of his pals, and as he wasn't about he asked the wife where he was.
"He's upstairs," said the wife. "Would you like to go up?"
"Ay," he said and went up.
"'Ello," he said to his pal. "What ar't doing?"
"Paintin' t'mangle."
"But what did ta bring t'mangle up 'eer for?"
"'Cos t'paint were up 'ere."

* * * *

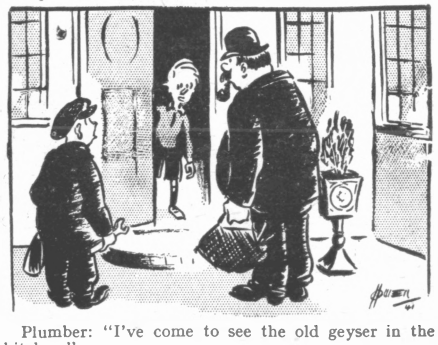
A negro doing a hauling job was told he could not get his money until he submitted a statement of his account.
After much meditation he evolved the following bill: "Three comes and three goes, at threepence a went, 1s. 6d."

* * * *

"Are you going to the lecture to-night?"
"Yes."
"I advise you to stay away. It's sure to be awfully boring."
"I'm afraid I can't get out of it—I'm the lecturer!"

* * * *

MISTAKEN IDENTITY



Plumber: "I've come to see the old geyser in the kitchen."
Tommy: "Mother, here's the doctor to see cook."

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GAUGE 'OO'

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